

US EPA RECORDS CENTER REGION 5



481464

ENVIRONMENTAL ASSESSMENT REPORT

ARLINGTON HEIGHTS LANDFILL
Arlington Heights, Illinois

February 1989

REPORT

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INTRODUCTION

Purpose and Scope

The Village of Arlington Heights is owner/operator of a non-hazardous sanitary landfill at the corner of Kennicott Avenue and Nichols Road. The landfill accepted municipal refuse from about 1964 until about 1974 and since then has accepted only demolition debris. The Village plans to close the landfill with intended end use as a nine-hole golf course, to be developed and administered by the Park District. Harza Environmental Services, Inc. (HES) was retained to perform two concurrent studies in relation to this intended end use:

- o Develop a closure and post-closure care period plan for the landfill; and
- o Identify environmental issues of actual or potential concern to the Village as owner/operator.

This report presents the results of the environmental investigations completed in accordance with HES' proposal of February 29, 1988.

Site Location and Surface Conditions

The Arlington Heights Landfill site occupies about 52 acres at the southwest corner of Kennicott Avenue and Nichols Road in northwest Cook County, Illinois (Exhibit 1). The portion of the site used for sanitary waste disposal occupies approximately half this area along the east and north sides. The present landform rises about 45 feet above the adjacent ground surface in the east and 10 to 15 feet in the north.

There are several small buildings in the south part of the site including an office and a fire-training facility. A 6-million gallon on-ground water tank is located in the southwest part of the site. A well owned by the Village is located adjacent to the tank as is a monitoring well installed by the Illinois EPA. Present disposal of demolition debris is in the northwest and north-central parts of the property, near a small pond.

Adjacent land use is residential and industrial or commercial. Areas north of Nichols Road and east of the north part of Kenicott Avenue are single-family residential, including new development construction. West of the site, new construction for light industry is currently underway. South of the site, land use includes parking lots and a large industrial facility owned by Honeywell. A shopping center is located about 1,500 feet southeast of the site.

POTENTIAL ENVIRONMENTAL CONCERNS

The environmental study was directed at overall characterization of site conditions and at specific issues identified as potential concerns. Specific potential concerns are summarized below:

- o **Groundwater Quality.** The Illinois EPA maintains a groundwater monitoring well in the southwest part of the site and the IEPA facility file does not indicate contamination of groundwater. However, a major objective of the present study was to determine the occurrence of groundwater beneath the site, identify groundwater usage patterns, establish basic groundwater quality, and evaluate whether groundwater quality had been impacted.
- o **Leachate Generation/Migration.** Generation and migration of leachate is a common concern at landfills. At this site, a leachate seep was discovered and repaired in 1984, suggesting that at least some leachate generation has occurred. In this program, observations during drilling and data from groundwater sampling and analysis were evaluated from the perspective of identifying whether leachate generation/migration was of major concern.
- o **Landfill Gas.** Generation of landfill gas, primarily methane, is common at sanitary landfills due to decomposition of organic material. The current program aimed at identifying whether gas generation presently is a significant concern and, if so, assess the potential for off-site migration of gas.
- o **IBT Vaults.** Early in this study, information was received by the Village from Illinois Bell Telephone Company (IBT) concerning apparent contamination of several IBT vaults along the east site boundary. Contaminants reportedly included several potentially hazardous organic compounds. Although full evaluation of this condition was not within the scope of the present study, the collected data were examined to determine whether the contamination could be related to the landfill.

SITE INVESTIGATIONS

Site investigations were completed between April 4 and May 13, 1988 and included:

- o Data Review;
- o Site Inspection;
- o Drilling and Soil Sampling;
- o Field Testing;
- o Collection of Potentiometric Data;
- o Groundwater Sampling and Analysis; and
- o Laboratory Soils Testing

These activities are described in the following paragraphs.

Data Review

Information available on site and area conditions were reviewed prior to the field work and included regional and site specific data. Regional data included:

- o Geologic and hydrogeologic publications.
- o Water well logs from the Illinois State Geological Survey.
- o USGS Topographic Quadrangle maps.

Site specific data included:

- o Site boring logs (Novak, Dempsey & Associates, 1972).
- o Results of leachate analysis (1984).
- o Orthophotomaps (1974)
- o Illinois EPA records on the landfill operation.
- o Results of chemical analysis, IBT vaults.

Additional information was obtained in discussions with Village personnel knowledgeable about the landfill history and operation.

Site Inspection

The site was inspected to locate surface features and potential drilling locations, to identify surface evidence of leachate or landfill gas migration, if any, and to characterize adjacent land use.

Drilling and Soil Sampling

Eight groundwater monitoring wells were installed to characterize subsurface soil units and groundwater flow patterns. Geologic data from these wells were supplemented by data from borings prepared in 1972 by Novak, Dempsey and Associates, Inc. and made available to HES by the Village. Four shallow soil borings also were completed to evaluate the thickness and properties of the existing landfill cover. Monitoring well and boring locations used in the evaluations are shown on Exhibit 2 and well data are summarized in Table 1.

Drilling was performed by Testing Service Corporation (TSC) of Carol Stream, Illinois, using 7-inch diameter hollow stem augers. Soil samples were obtained continuously using a 2-inch diameter split spoon sampler and Standard Penetration Test (SPT) methods (the sampler was driven 24-inches for each sample rather than the 18-inches used in the SPT method). A HES hydrogeologist monitored the drilling, prepared geologic logs, and evaluated the boring data. Field classification of soil samples used the Unified Soil Classification (USC) System. Geologic logs are presented in Appendix A.

TABLE 1

Monitoring Well Data

| Well/Boring Number | Ground | Top of Casing | Drilled | Screen |
|-----------------------|-------------------------|-------------------------|----------------------|----------------------|
| | <u>Elevation</u> (1) | <u>Elevation</u> (1) | <u>Depth</u> (ft) | <u>Depth</u> (ft) |
| MW-1 | 112.18 | 114.26 | 40.0 | 33.5-38.5 |
| MW-2 | 88.83 | 90.41 | 20.0 | 8.6-13.6 |
| MW-3 | 92.67 | 94.47 | 24.0 | 10.7-15.7 |
| MW-4 | 99.62 | 102.52 | 34.0 | 26.9-31.9 |
| MW-5 | 86.52 | 89.02 | 22.0 | 16.5-21.5 |
| MW-6 | 120.15 | 123.15 | 46.0 | 38.8-43.8 |
| MW-7 | 113.15 | 115.40 | 48.0 | 42.6-47.6 |
| MW-8 | 98.65 | 101.10 | 24.0 | 17.4-22.4 |

NOTE: Elevations are relative to site datum - 100 ft at the fire hydrant in the northeast corner of the site.

Monitoring wells were constructed with 2-inch diameter PVC casing, 5-foot long, 10-slot PVC well screen, sand pack, bentonite pellet seals, Volclay High Solids Grout, surface concrete and lockable steel surface protectors. Construction sketches are included in Appendix A. Wells were developed by bailing which continued until the discharge water was stable with respect to pH, temperature, and conductivity. Several wells remained turbid due to poor recharge characteristics.

The ground elevation, top of casing elevation (monitoring wells), and location of each well and boring were surveyed by TSC after completion. Because no bench marks are available on-site, a fire hydrant at the northeast corner of the site was used as site datum.

Air Monitoring

Air monitoring was performed during all field activities both as a health and safety precaution and to provide supplementary information on soil or groundwater contamination or landfill gas generation. Monitoring was performed using an HNu photoionization detector (PID) equipped with a 11.7 eV probe and with an explosive gas meter. Readings are included on boring logs in Appendix A.

Field Testing and Potentiometric Data

Variable head hydraulic conductivity tests were performed in each well. Three wells (MW-2, MW-6, and MW-8), recharged too rapidly for reliable measurements and these could not be analyzed. Groundwater levels were measured in the wells after installation and before the hydraulic conductivity tests and were used to assess groundwater flow directions and rates.

Laboratory Soils Testing

Selected soil samples from the drilling were tested by TSC for physical properties. Tests further characterized the site subsoils and provided data for engineering studies. Tests included classification, water content, gradation (sieve), liquid and plastic limits, unconfined compressive strength, dry density, and optimum moisture. Tests reports are presented in Appendix B.

Groundwater and Surface Water Sampling and Analysis

Groundwater samples were collected from the monitoring wells using a hand bailer after purging of the wells. A surface water sample also was collected from the pond in the northwest part of the site. Sampling equipment was decontaminated with steam between each use. Samples were analyzed to characterize water chemistry and indicate contamination. Parameters analyzed included pH, specific conductance, total organic carbon (TOC), total organic halogens (TOX), alkalinity (bicarbonate), chloride, sulfate, calcium, magnesium, potassium, and sodium. Analyses were per-

formed by NET-Midwest of Bartlett, Illinois. Laboratory reports are presented in Appendix C.

REGIONAL GEOLOGY AND GROUNDWATER USE

The site area is underlain by thick glacial drift deposits resting on Silurian dolomite bedrock. The glacial drift is approximately 150 feet thick and consists primarily of clayey soils (till) deposited by the glaciers. The tills contain intermittent seams and interbeds of sand and gravel. The drift, collectively, is of Wisconsin age and is assigned to the Woodfordian Substage. A number of sand pits are located on and near the site, suggesting the presence of shallow sand deposits in the site area.

Groundwater is an important resource in northern Illinois. There are three major groundwater aquifers commonly used for water supply. These are:

- o Cambrian-Ordovician aquifers;
- o Silurian dolomite aquifer; and
- o Glacial drift aquifers.

The Cambrian-Ordovician aquifers are sandstone bedrock units which occur at depths of 500 to 2,000 feet below the surface. These can provide large quantities of groundwater to wells and often are used for municipal or industrial water supply. Yields often are 1,000 gallons per minute or more. There are two wells in this aquifer within about a half mile of the site. However, because of their depth, these aquifers have little bearing on the site investigation.

The Silurian dolomite is a major bedrock aquifer in most of northern Illinois and, depending on its local properties, can provide sufficient groundwater for municipal and industrial supply. In the site area, it is more commonly used for domestic supply at yields generally between 10 and 25 gallons per minute. There are at least 7 dolomite wells within about one-half mile of the site, including a well owned by the Village within the site. The top of the dolomite is estimated to occur at depths in excess of 150 feet based on the well records in the area, and the piezometric surface typically occurs at depths between about 75 and 100 feet. Regionally, groundwater flow in the dolomite is controlled by major surface drainages and areas of concentrated pumping withdrawal. In the site area flow in the dolomite is estimated to be generally eastward, toward the DesPlaines River.

The glacial drift is a variable, but important, groundwater resource in northern Illinois, although it is not used near the site. The clayey till which comprises most of the drift in northern Illinois generally contains little free groundwater and is not a significant resource. However, sand and gravel units in the till can contain substantial groundwater and, if continuous and extensive, can supply water to domestic and, locally, municipal or industrial wells. The most productive sands and gravels frequent-

ly underlie major drainages or immediately overlie bedrock. Where overlying the dolomite bedrock, the two aquifers are in hydraulic communication. The piezometric or water table depth in the drift cannot be determined on a regional basis because of the variability of the unit. In general, groundwater flow will parallel topography but can vary in any specific area. Groundwater also occurs at shallower depths in the drift, generally in localized sand and gravel seams such as encountered at this site. These shallow water-bearing zones may be used for domestic water supply, but are variable in occurrence and properties and generally are not suitable for more extensive development. There are no records of water supply wells in the drift within about 1/2 mile of the landfill.

SITE CONDITIONS

Site Geology and Hydrogeology

Soil Units. The site drilling program investigated subsurface soil conditions to depths of 22 to 48 feet around the site perimeter. These data were supplemented by review of boring logs prepared by Novak, Dempsey and Associates, Inc. in 1972, some of which extended to greater depths. Soil units typically encountered in the monitoring wells are illustrated by geological cross-sections A, B, and C on Exhibits 4, 5, and 6.

All monitoring well borings penetrated topsoil and were completed in the underlying glacial drift. The borings were not designed to penetrate bedrock, which is estimated to occur at a depth of 150 feet under the site.

The topsoil ranged in thickness from about 2 inches in well MW-4 to 24 inches in MW-1 and MW-6 and consists of brown and yellow clay with traces of sand, silt and roots. The topsoil is underlain by glacial drift consisting predominantly of dense clay (CL in the Unified Soil Classification System), with varying quantities of silt, sand, small and large gravel and, locally, cobbles. Silt seams were encountered locally. Within the clayey till, the wells penetrated a strata of multicolored, fine- to coarse-grained sand and gravel. The top of this unit ranged in depth from 6 feet in MW-2 to 44 feet in MW-7. This unit comprises a shallow groundwater aquifer and appears to be continuous under the site. It varies widely in thickness from only 1.5 feet in MW-4 to more than 12 feet in MW-1 and MW-8, where the bottom was not encountered. Some of the 1972 boring logs suggest that the sand may attain local thicknesses of 36 feet. In most wells and borings, the sand was underlain by clays similar to those above.

Groundwater Occurrence. Groundwater was encountered in all monitoring wells, primarily in the shallow sand aquifer. All of the monitoring wells were screened in this zone. In most wells, this shallow sand unit is fully saturated and the groundwater is confined, groundwater levels rising above the top of the water bearing strata. In wells MW-1 and MW-6, the upper part of the

sand was not saturated and, in these areas, the aquifer is unconfined and the measured water levels represent the top of the saturated zone (e.g. "water table" conditions). This is due to variations in groundwater elevations and in the elevation and thickness of the water-bearing zone across the site.

Hydraulic Conductivity. Results of field permeability tests performed in the monitoring wells are summarized in Table 2.

TABLE 2
Results of Field Hydraulic Conductivity Tests
in Monitoring Wells

| <u>Well Number</u> | <u>Estimated Hydraulic Conductivity</u> |
|--------------------|---|
| 1 | 0.09 ft/min |
| 2 | (1) |
| 3 | 0.01 ft/min |
| 4 | 0.02 ft/min |
| 5 | 0.05 ft/min |
| 6 | (1) |
| 7 | 0.05 ft/min |
| 8 | (1) |

NOTE: (1) Recharge too rapid for analysis.

Since all of the wells are screened in the shallow sand zone, the test results are representative of this unit and indicate an average estimated field hydraulic conductivity of about 0.04 ft/min (2.18×10^{-2} cm/sec). Tests were not performed in the clayey portions of the glacial drift, but these materials typically have field permeabilities of 1×10^{-6} or 1×10^{-7} cm/sec.

Groundwater Flow. The depth to groundwater was measured in each monitoring well and the data converted to relative potentiometric elevations. Potentiometric elevations were used to generate potentiometric contours on Exhibit 6.

The potentiometric contours indicate the pattern of groundwater movement in the shallow sand aquifer at the site. Groundwater flow patterns are relatively complex, reflecting the variable geometry, properties and thickness of the water-bearing unit. Typical of many shallow drift sands, there are several groundwater flow divides and overall flow patterns in adjacent areas are not clearly defined. Principal subsurface inflow to the site occurs in the vicinity of MW-3 in the southwest, MW-2 in the northwest and, possibly, MW-1 on the east. Principal discharge areas are near MW-5 on the west and MW-6 and MW-7, in the southeast. Additional discharge may occur under part of the north boundary at wells MW-4 and MW-8. In general, wells MW-2 and 3 are upgradient wells and MW-5, MW-6, and MW-7 are downgradient.

Hydraulic gradients in the sand are variable across the site

because of the relatively complex flow pattern. Calculated gradients range from about 0.003 ft/ft to 0.012 ft/ft in different areas. Using Darcy's Law in the form of $v = ki/n$, where "v" the average groundwater flow velocity in the sand, "k" is the average hydraulic conductivity (0.04 feet/min from the field tests), "i" is the hydraulic gradient (described above), and "n" is the effective porosity (estimated at 30 percent), groundwater flow velocities in different site areas are estimated to range between about 0.6 and 2.3 feet/day.

The shallow groundwater zone at the site probably is hydraulically connected to surface water in the pond in the northwest part of the site. This connection results in recharge of the groundwater by infiltration from the pond which further distorts local groundwater flow patterns. Data are not sufficient to define this connection in detail.

Groundwater Quality. Results of analysis of groundwater samples are summarized in Table 3. Maximum, minimum and average analytical results for the groundwater samples are compared to results from the on-site pond in Table 4.

The parameters analyzed were selected to characterize overall groundwater chemistry and as indicators of possible groundwater contamination. In the present study, they were not intended to identify specific contaminants.

The analyses indicate that concentrations of most constituents are within the range of values expected for shallow groundwater in the region. Generally, wells MW-1, MW-3, and MW-8 have the highest concentrations of indicator parameters TOC, TOX, and specific conductance. Of these, MW-3 is clearly upgradient and unaffected by the landfill, while MW-1 and MW-8 are located such that impacts are possible, although not clearly defined. Evaluation of the analytical and groundwater data, however, suggests no pattern indicative of groundwater contamination due to the landfill.

Landfill Cap

Borings SB-1 through SB-4 were drilled to evaluate the thickness and properties of the existing landfill cap. Borings SB-1 and SB-2 indicate that the cap in the north part of the landfill is 3 to 3.5 feet thick while borings SB-3 and SB-4 indicate that the cap in the east part of the landfill is 11 and 9.5 feet thick, respectively. Field classifications and laboratory tests on samples from the borings indicate that the cap materials are organic and inorganic clays (OL, OH and CL in the Unified Soil Classification System) with dry densities ranging from 84.8 to 118.8 lbs/cubic ft. Further results of physical properties tests on the cap material are presented in Appendix B.

TABLE 3

Results of Laboratory Chemical Analysis - Monitoring Wells

| PARAMETER | Concentration/Monitoring Well Number | | | | | | | | Unit |
|--------------------------|--------------------------------------|-------|-------|--------|--------|-------|-------|-------|----------|
| | MW-1 | MW-2 | MW-3 | MW-4 | MW-5 | MW-6 | MW-7 | MW-8 | |
| Bicarb-CaCO ₃ | 412 | 476 | 478 | 294 | 138 | 388 | 230 | 680 | mg/l |
| Chloride | 112 | 140 | 254 | 82 | 24 | 182 | 128 | 210 | mg/l |
| Conductivity | 1540 | 1770 | 2530 | 1100 | 934 | 1430 | 1040 | 2200 | umhos/cm |
| pH | 7.42 | 7.43 | 6.93 | 7.42 | 7.90 | 7.16 | 7.43 | 6.85 | Units |
| Sulfate | 219 | 205 | 369 | 131 | 239 | 84 | 75 | 59 | mg/l |
| TOC | 4.7 | 4.4 | 12.2 | 2.0 | 2.4 | 2.1 | 1.8 | 20.6 | mg/l |
| TOX | 0.080 | 0.013 | 0.093 | <0.005 | <0.005 | 0.009 | 0.018 | 0.056 | mg/l |
| Calcium | 159 | 118 | 238 | 89.3 | 81.6 | 137 | 93.8 | 157 | mg/l |
| Magnesium | 68 | 85 | 90 | 47 | 26.7 | 48 | 48.3 | 66 | mg/l |
| Potassium | 7.58 | 26.2 | 5.33 | 3.95 | 3.25 | 5.35 | 4.79 | 37.2 | mg/l |
| Sodium | 52.5 | 83 | 161 | 27.6 | 62 | 61 | 46.3 | 163 | mg/l |

TABLE 4

Comparison of Laboratory Chemical Analysis,
Monitoring Wells vs Surface Water Pond

| PARAMETER | Groundwater | | | Pond Sample | Unit |
|--------------------------|-------------|--------|--------|----------------|----------|
| | MAX | MIN | AVG(1) | | |
| Bicarb-CaCO ₃ | 680 | 138 | 387 | 138 | mg/l |
| Chloride | 254 | 24 | 142 | 72 | mg/l |
| Conductivity | 2530 | 934 | 1568 | 659 | umhos/cm |
| pH | 7.90 | 6.85 | 7.32 | 8.15 | Units |
| Sulfate | 369 | 59 | 173 | 62 | mg/l |
| TOC | 20.6 | 1.8 | 6.3 | 5.1 | mg/l |
| TOX | 0.093 | <0.005 | 0.034 | 0.006 | mg/l |
| Calcium | 238 | 81.6 | 134 | 59.7 | mg/l |
| Magnesium | 90 | 26.7 | 60 | 21.4 | mg/l |
| Potassium | 37.2 | 3.25 | 12 | 3.9 | mg/l |
| Sodium | 163 | 27.6 | 82 | 39.3 | mg/l |

(1) Average of all available analytical results.
 < = Parameter not detected at indicated limit.

Landfill Gas

Landfill gas was encountered during drilling of wells MW-1 and MW-6 along the southeast site perimeter based on results of air monitoring and field observations. The upper part of the shallow sand zone is not saturated in this local area, providing a potential gas migration pathway in the unsaturated zone. In other site monitoring wells, the sand is fully saturated, not providing a pathway for gas migration. Landfill gas also was detected in landfill cap borings SB-3 and SB-4, indicating that some gas is being generated, but is generally contained by the present cap. The site inspection did not indicate evidence of vegetative stress which often is an indicator of landfill gas. Evaluation of all data indicates that, although landfill gas is being generated to some degree, the natural clayey soils and saturated sands control lateral migration except at MW-1 and MW-6, and that the existing cap effectively controls upward migration. Landfill gas does not appear to represent a major problem for off-site migration, although provision for gas observation may be required in the closure plan.

IBT Vaults

In October 1987, IBT representatives met with Village personnel and notified the Village that inspection of a conduit system they had installed along the east site boundary was contaminated by various volatile organic compounds. IBT had observed possibly contaminated liquids in four vaults along the conduit system which are accessed by manholes. The vaults are shown approximately on Exhibit 2. Vault 1 is located south of the site entrance gate on Kennicott Avenue and vaults 2, 3, and 4 along the east site boundary. NOT

IBT collected samples of the water in the vaults which were analyzed by MetPath-Teterboro Laboratory of New Jersey for various heavy metals and organic compounds. Results indicated variable concentrations of several compounds of potential environmental concern, summarized in Table 5. In August of 1984, IEPA also sampled and analyzed leachate from the seep identified and repaired at that time. For comparison, these results also are shown.

Except for benzene and toluene, the contaminants detected in the vaults and the leachate sample are chlorinated organic compounds used as solvents, cleaning or degreasing fluids, refrigerants, and in chemicals and plastics manufacturing, among other uses. They include several compounds of potential concern from environmental and human health viewpoints. For example, chlorinated organic chemicals tend to persist in the environment and are not readily biodegraded. Further, chloroform, chloromethane, 1,2-dichloroethane, methylene chloride, tetrachloroethene, trichloroethene, vinyl chloride and benzene are known or suspected human carcinogens.

The highest contaminant concentrations and greatest number of different compounds were found in vaults 2 and 3 adjacent to the southeast side of the site. Lower concentrations and generally fewer different contaminants were found in vaults 1, south of the site, and 4, on the northeast corner. This pattern suggests the possibility that the contamination may have resulted from the landfill, although subsequent migration through the conduits or other pathway would then be required and other sources are equally possible (e.g. off-site spills or dumping). Comparison of analytical results from the vaults and the leachate seep indicate that, although there are similarities in the contaminants detected, there also are disparities and no reliable conclusion can be reached. Nonetheless, the nature of the contamination is such that the possibility of the landfill being the source should be examined.

If the landfill is the source of the contamination in the vaults, the contamination must derive from migration of leachate. For this to be the case, a migration pathway must exist either with groundwater in the shallow sand aquifer or in local permeable seams above the sand. Data from the monitoring wells show that the sand and potentiometric levels in the sand are below the vaults and, therefore, this possible pathway does not apply.

The possibility of leachate migration to the vaults in shallow zones above the sand aquifer cannot be resolved with the available data. Such zones can be quite limited in extent and, although not encountered in the drilling, could occur between the well locations. At the present time, the available data are sufficient only to say that no evidence of leachate migration was observed at the locations of the monitoring wells. However, this possibility must be considered until further data are available.

SUMMARY AND CONCLUSIONS

The environmental study of the Arlington Heights Landfill site indicates the following site conditions:

- o The site is underlain by approximately 150 feet of unconsolidated glacial drift sediments. The drift consists primarily of low permeability clay tills, but contains a sand and gravel layer at variable depths from 6 to 44 feet across the site. This seam is continuous under the site and comprises a shallow water-bearing unit.
- o The shallow groundwater is not used for water supply in the area.
- o Groundwater quality at the site generally is within normal parameters. The presence of halogenated organic compounds is indicated, but is not reflected in a pattern related to the landfill.
- o The presence of past leachate generation is indicated by a

Seasonal
changes
stochastic
control

not by
new
sampling
So what's
the
point?

TABLE 5.

Volatile Organic Analyses - Leachate and IBT Vaults

| COMPOUND | Seep | CONCENTRATION (ug/l) | | | |
|------------------------------|------|----------------------|--------|-------|------|
| | | -----IBT Vaults----- | | | |
| | | #1 | #2 (5) | #3 | #4 |
| Chloroform | ND | ND | ND | 1.9 | ND |
| Chloromethane (1) | ND | ND | ND | ND | ND |
| 1,2-dichloroethane (2) | 7.5 | ND | 15.8 | 17.4 | 10.9 |
| Trans-1,2-dichloroethene (3) | ND | 104 | 6224 | 291.4 | 78.3 |
| 1,2-dichloropropane (4) | ND | ND | 79.2 | 9.9 | ND |
| Trans-1,3-dichloropropene | ND | ND | 384 | ND | ND |
| Methylene chloride | ND | ND | ND | 2.8 | ND |
| tetrachloroethene | ND | ND | ND | 4.3 | ND |
| Trichloroethene | 124 | 2.3 | 75.0 | 28.2 | ND |
| Vinyl chloride | ND | 12.2 | 370 | 42.6 | 8.1 |
| Benzene | 22.2 | ND | ND | 4.7 | ND |
| Toluene | 270 | ND | ND | ND | ND |
| Carbon Tetrachloride | 600 | ND | ND | ND | ND |
| 1,1,1-trichloroethane | 600 | ND | ND | ND | ND |
| 1,1-dichloroethane | 700 | ND | 78.2 | ND | ND |
| 1,2-transdichloroethylene | 20.7 | ND | ND | ND | ND |
| 1,2-Cis-dichloroethylene | 1700 | ND | ND | ND | ND |

ND = Parameter not detected.

(1) Methyl chloride.

(2) Ethylene dichloride.

(3) Acetylene dichloride.

(4) Propylene dichloride.

(5) Higher of two analyses.

reported leachate seep in 1984. However, groundwater or surface water impacts are not indicated.

- o Landfill gas is being generated in unknown, but apparently not large quantities. The present landfill cap appears to control upward migration of gas, while the clayey soils and saturated sands control lateral migration in most areas. Locally unsaturated portions of the shallow aquifer allow lateral migration of gas in parts of the east site boundary.
- o Reported volatile organic contamination in IBT vaults along the east site boundary includes compounds of concern. Leachate migration from the landfill is one of several possible sources. The contamination is not due to leachate migration with groundwater in the shallow sand layer. However, the possibility of leachate migration in localized, shallower soil zones cannot be eliminated with the available data.

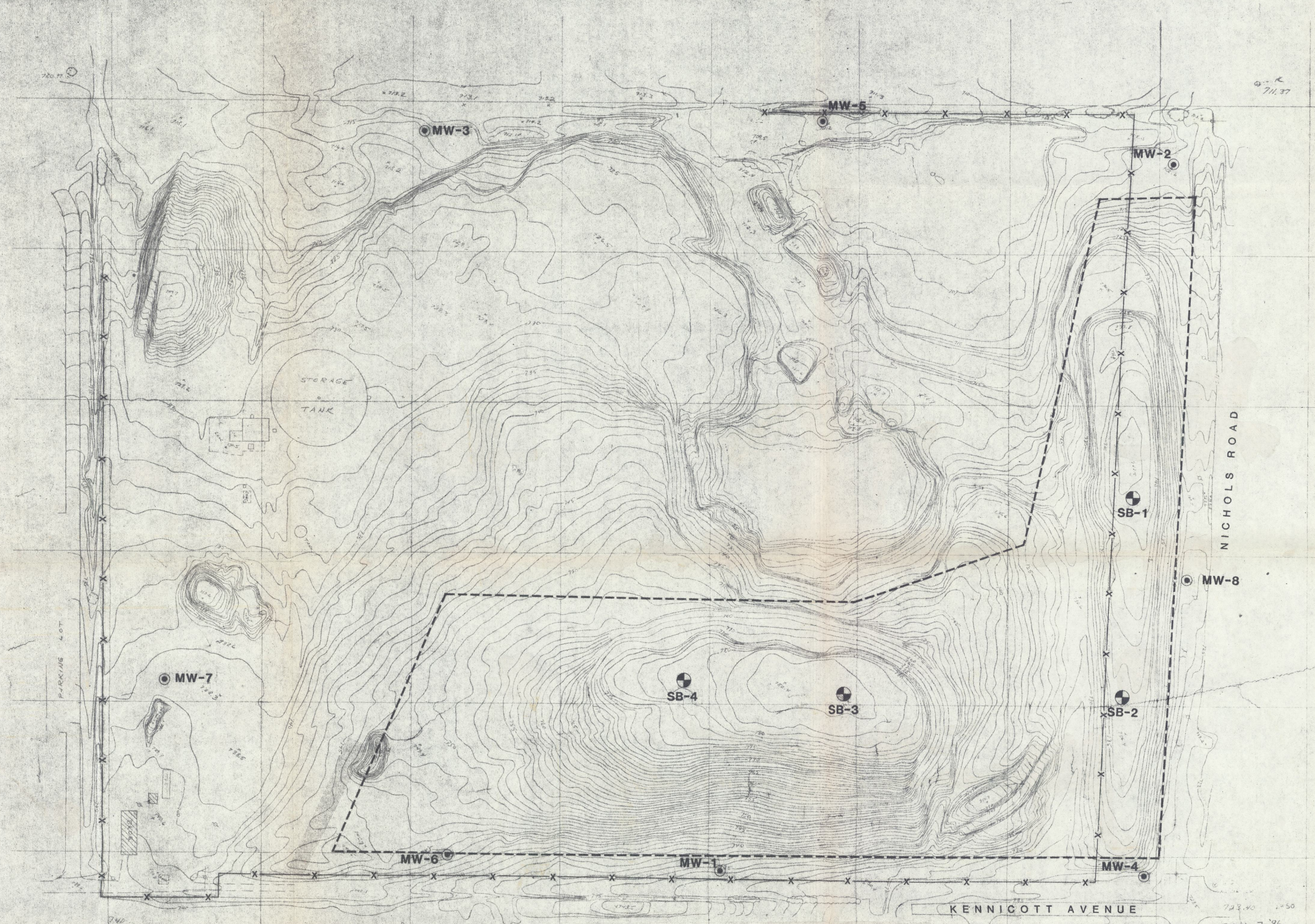
Results of site investigations do not indicate environmental problems which, in our judgement, cannot be adequately addressed in the closure and end use. The following activities are recommended to be addressed prior to or during implementation of the closure and end use plan.

- o Contamination of the IBT vaults should be investigated to determine whether the landfill is the source of contamination. We recommend the following activities prior to or during implementation of the closure plan:
 - 1) The vaults should be inspected to establish present conditions (presence and nature of contamination, possible points of entry, apparent means of contaminant migration between vaults, etc.). If contamination is present, collect additional samples and analyze for compounds of concern using appropriate chain-of-custody and QA/QC protocols.
 - 2) The Village should investigate the possibility that leachate is migrating from the landfill by completing a series of test pits along the east site boundary. Pits should be excavated to depths equivalent to the vaults. Evidence of leachate migration in the shallow soils should be determined visually and by air monitoring and soil samples should be collected and analyzed for contaminants of concern.
 - 3) The Village should sample and analyze groundwater from monitoring wells showing elevated TOX levels for specific organic and heavy metal contaminants. The wells nearest the vaults (MW-1, MW-4 and MW-6) should be included.

If the landfill is indicated to be the cause of contamination to the vaults, provision will be required in the closure plan for appropriate mitigation measures.

- o Implement groundwater monitoring using the wells installed in this program. Groundwater monitoring will be part of the post-closure care period plan. *not done?*
- o Although not indicated to be a major problem, regular inspection for gas migration and provision for gas monitoring along the east side of the site is recommended.

EXHIBITS



LEGEND

— x — EXISTING FENCE

- - - - - APPROXIMATE LIMIT OF MUNICIPAL REFUSE

● MONITORING WELL LOCATION (1988)

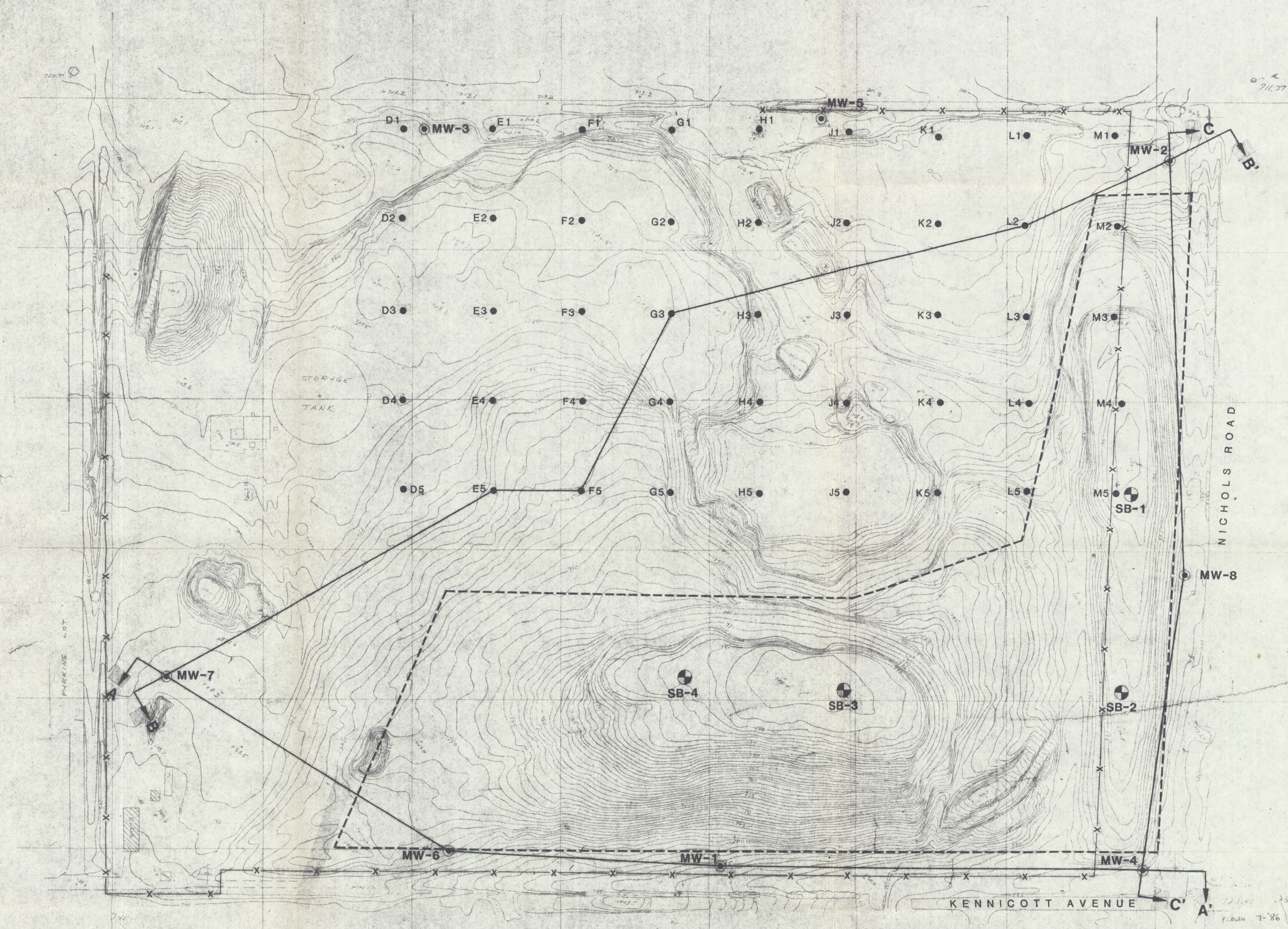
⊗ SOIL BORING LOCATION (1988)

SCALE 100 0 100 Feet

| APPROVED | | |
|----------|----------|--|
| DSGN. | REVIEWED | |
| CHKD. | | |
| DWN. | | |
| CHKD. | | |
| SUBM. | | |
| | CIVIL. | |
| | MECH. | |
| | ELECT. | |

| REV. NO. | DWG. TRANSMITTAL LETTER NO. | DATE | NATURE OF REVISION | BY | CHKD. | APPD. |
|----------|-----------------------------|------|--------------------|----|-------|-------|
| | | | | | | |

| | |
|---|--------------------------|
| VILLAGE OF ARLINGTON HEIGHTS ARLINGTON HEIGHTS, ILLINOIS | |
| ARLINGTON HEIGHTS LANDFILL | ENVIRONMENTAL ASSESSMENT |
| SITE LOCATION MAP | |
| HESHARZA ENVIRONMENTAL SERVICES, INC. | |
| CHICAGO, ILLINOIS | DATE SEPT. 1988 |
| PROJECT MANAGER | |
| DRAWING No. | |



- LEGEND**
- x — EXISTING FENCE
 - - - - - APPROXIMATE LIMIT OF MUNICIPAL REFUSE
 - MONITORING WELL LOCATION (1988)
 - ⊗ SOIL BORING LOCATION (1988)
 - ⌞ CROSS-SECTION
 - EXISTING BOREHOLE (By Others)

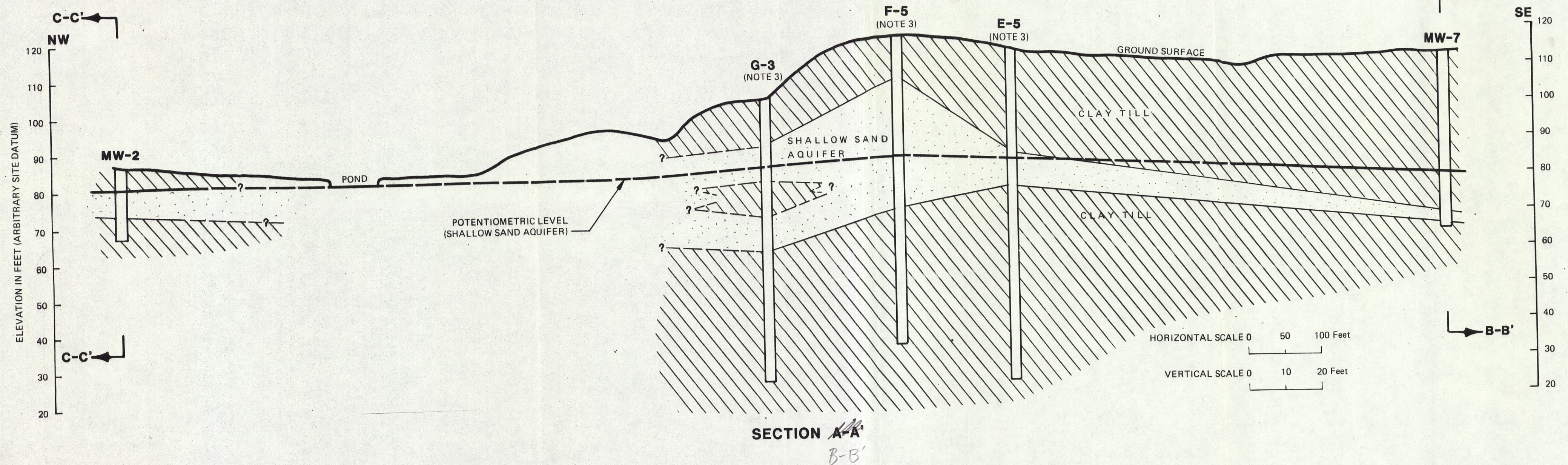
- NOTES**
1. SEE EXHIBIT 3, 4, and 5 FOR GEOLOGIC CROSS-SECTIONS.
 2. SEE APPENDIX A FOR GEOLOGIC LOGS AND CONSTRUCTION SKETCHES OF MONITORING WELLS.
 3. EXISTING BOREHOLES COMPLETED BY NOVAK, DEMPSEY and ASSOCIATES IN 1972. LOGS NOT INCLUDED.

SCALE 100 0 100 Feet

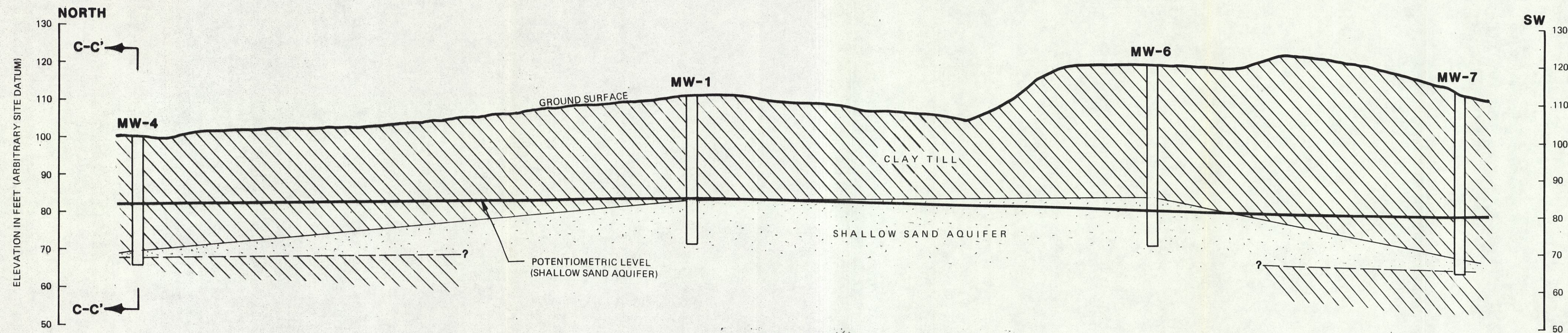
| APPROVED | | |
|----------|----------|--|
| DSGN. | REVIEWED | |
| CHKD. | CIVIL | |
| DWN. | MECH. | |
| CHKD. | ELECT. | |
| SUBM. | | |

| REV. NO. | DWG. TRANSMITTAL LETTER NO. | DATE | NATURE OF REVISION | BY | CHKD. | APPD. |
|----------|-----------------------------|------|--------------------|----|-------|-------|
| | | | | | | |

| | |
|---|--------------------------|
| VILLAGE OF ARLINGTON HEIGHTS ARLINGTON HEIGHTS, ILLINOIS | |
| ARLINGTON HEIGHTS LANDFILL | ENVIRONMENTAL ASSESSMENT |
| MONITORING WELL AND BORING LOCATION MAP | |
| HESHARZA ENVIRONMENTAL SERVICES, INC. | |
| CHICAGO, ILLINOIS | DATE SEPT 1988 |
| PROJECT MANAGER | |
| DRAWING No. | |



**GENERALIZED GEOLOGIC
CROSS-SECTION A-A'**
ARLINGTON HEIGHTS LANDFILL
Arlington Heights, Illinois



SECTION B-B'

A-A'

LEGEND

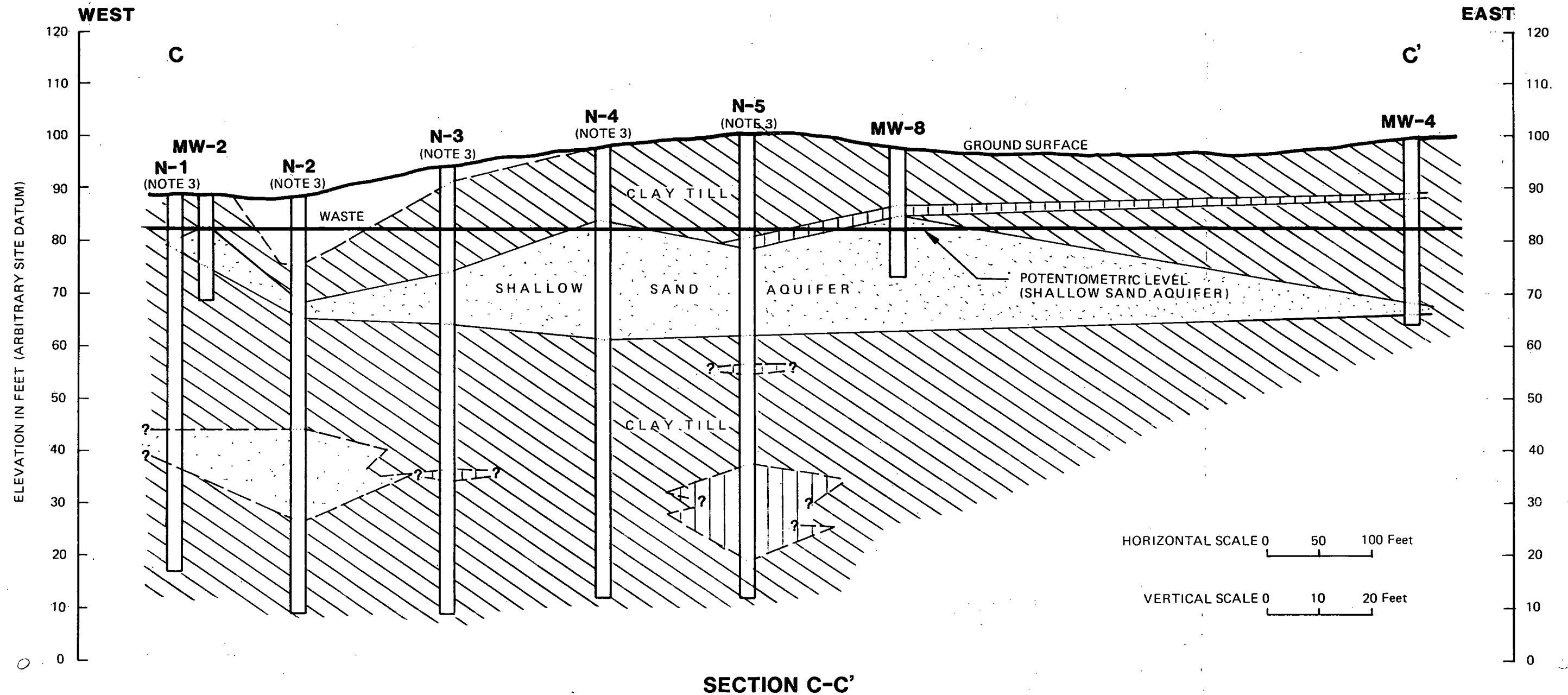
| | |
|--|------------------------------|
| | Clay |
| | Silt |
| | Sand |
| | Generalized geologic contact |
| | Potentiometric level (1988) |

NOTES

1. See Exhibit 2 for well and section locations.
2. See Appendix A for well logs and construction sketches.

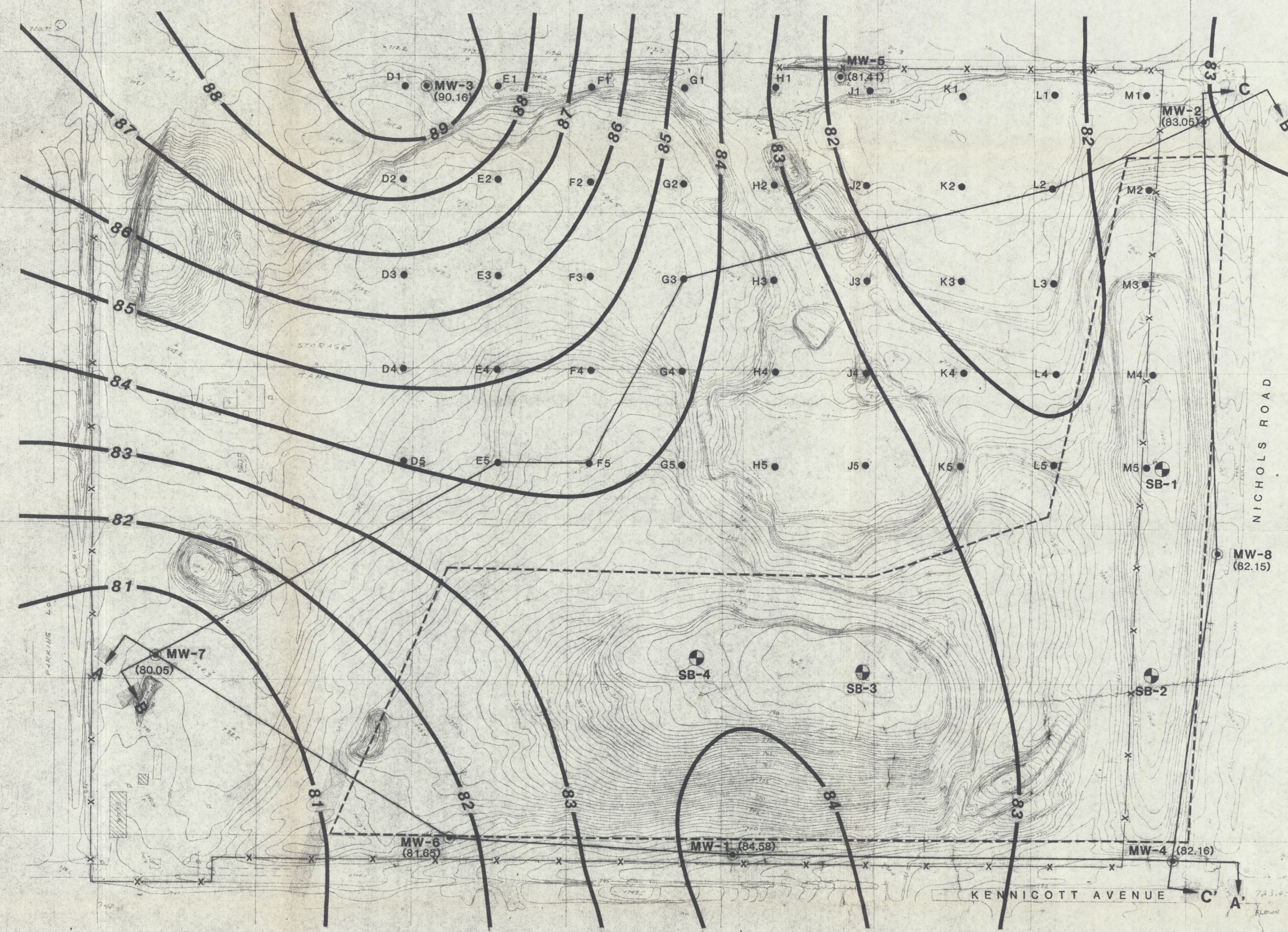
HORIZONTAL SCALE 0 50 100 Feet

VERTICAL SCALE 0 10 20 Feet



GENERALIZED GEOLOGIC CROSS-SECTION C-C'

ARLINGTON HEIGHTS LANDFILL
Arlington Heights, Illinois



LEGEND

- x— EXISTING FENCE
- - - - - APPROXIMATE LIMIT OF MUNICIPAL REFUSE
- MONITORING WELL LOCATION (1988)
- ⊙ SOIL BORING LOCATION (1988)
- 89— GENERALIZED PIEZOMETRIC CONTOUR
- 81— EXISTING BOREHOLE (By Others)
- CROSS-SECTION—

NOTES

1. SEE EXHIBIT 3, 4, and 5 FOR GEOLOGIC CROSS-SECTIONS.
2. SEE APPENDIX A FOR GEOLOGIC LOGS AND CONSTRUCTION SKETCHES OF MONITORING WELLS.
3. EXISTING BOREHOLES COMPLETED BY NOVAK, DEMPSEY and ASSOCIATES IN 1972. LOGS NOT INCLUDED.
4. PIEZOMETRIC ELEVATIONS BASED ON ARBITRARY SITE DATUM OF 100 AT TOP OF FIRE HYDRANT AT NORTHEAST CORNER OF SITE.

SCALE 100 0 100 Feet

| APPROVED | | REVIEWED | |
|----------|--|----------|--|
| DSGN. | | CIVIL | |
| CHKD. | | MECH. | |
| DWN. | | ELECT. | |
| CHKD. | | | |
| SUBM. | | | |

| REV. NO. | DWG. TRANSMITTAL LETTER NO. | DATE | NATURE OF REVISION | BY | CHKD. | APPD. |
|----------|-----------------------------|------|--------------------|----|-------|-------|
| | | | | | | |

| | |
|--|--------------------------|
| VILLAGE OF ARLINGTON HEIGHTS ARLINGTON HEIGHTS, ILLINOIS | |
| ARLINGTON HEIGHTS LANDFILL | ENVIRONMENTAL ASSESSMENT |
| GENERALIZED PIEZOMETRIC CONTOURS Shallow Sand Aquifer | |
| <div style="display: flex; justify-content: space-between;"> <div> HES HARZA <small>ENVIRONMENTAL SERVICES, INC.</small> </div> <div> PROJECT MANAGER CHICAGO, ILLINOIS DATE SEPT 1988 </div> </div> | |
| DRAWING No. | |

APPENDICES

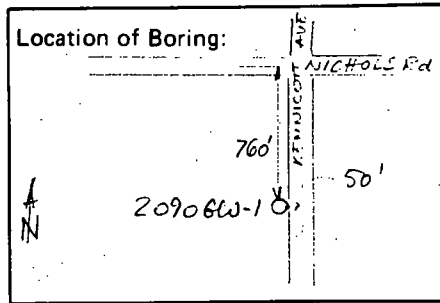
Appendix A

Boring Logs and Well Construction Sketches

SOIL BORING LOG

Sheet 1 of 3

PROJECT: ARLINGTON HEIGHTS LANDFILL 2090 B



Water Depth: 27.55 27.6
Date: 4-27 5-13
Time: 1000a 1200p
Hole Depth: 32.52 38.0
Casing Depth: _____

Boring No.: MW-1
Feature: EAST SIDE
Coordinates: N _____
E _____

Drilling Method (s): H.S. AUGER

Ground Elevation: 112.18*

Casing Elevation: 114.26*

Date Started: 4-26-88 Time: 0100P Hole/Casing Size (s): 7" BORING

Total Depth: 40.0

Date Completed: 4-27-88 Time: 1000a 2" PVC CASING/SCREEN

Bottom Elevation: 72.18

Sampling Method (s): SPT 24" SPOON - CONTINUOUS SAMPLING

Sample Dimensions: 1.37 IN Hammer Weight/Drop: 140 / 30 IN

Surface Conditions: GRASS

| Boring Depth (ft/m) | Sample Depth (ft/m) | Sample No. | Blows per 6 in/15 cm | Length Driven (in/cm) | Length Recovered (in/cm) | Graphic Recovery | Unified Soil Classification | Graphic Log | SOIL DESCRIPTION | REMARKS |
|---------------------|---------------------|------------|----------------------|-----------------------|--------------------------|------------------|-----------------------------|-------------|---|-------------------------|
| 1 | | 1 | 5 | 24 | 6 | | | | 0-2 TOP SOIL W/ORGANIC | * ARBITRARY SITE DATUM. |
| 2 | 2 | | 7 | | | | CL | | 2-4 DARK CLAY TRACE OF SAND | |
| 3 | | 2 | 8 | 24 | 6 | | | | | |
| 4 | 4 | | 23 | | | | CL | | | |
| 5 | | 3 | 14 | 24 | 6 | | | | 4-6 YELLOW CLAY TRACE GRAVEL HARD | |
| 6 | 6 | | 20 | | | | CL | | | |
| 7 | | 4 | 25 | 24 | 12 | | | | 6-8 LIGHT BROWN TO GRAY CLAY VERY HARD. | |
| 8 | 8 | | 23 | | | | CL | | | |
| 9 | | 5 | 18 | 24 | 14 | | | | 8-10 SAME | |
| 10 | 10 | | 10 | | | | CL | | | |
| 11 | | 6 | 13 | 24 | 14 | | | | 10-12 SAME | |
| 12 | 12 | | 17 | | | | CL | | | |
| 13 | | 7 | 18 | 24 | 12 | | | | 12-14 SAME GRAY CLAY | |
| 14 | 14 | | 14 | | | | CL | | | |
| 15 | | | 21 | | | | | | 14-16 SAME GRAY CLAY | |
| | | | 3 | | | | | | | |
| | | | 5 | | | | | | | |

Drilling Contractor: TSC
 Logged By: JJP
 Checked By: RPC
 Date: 7-27-88

SOIL BORING LOG

(Continued)

 Sheet 2 of 3

 PROJECT: ARLINGTON HEIGHTS LANDFILL 20903

 Boring No.: MW-1

 Date: 7-28-71

 Checked By: Mark

 Logged By: JJP
TSC

Drilling Contractor:

| Boring Depth (ft/m) | | Sample Depth (ft/m) | | Sample No. | Blows per 6 in/15 cm | Length Driven (in/cm) | Length Recovered (in/cm) | Graphic Recovery | Unified Soil Classification | Graphic Log | Sampling Method(s): <u>SPT 24" SPOON - CONTINUOUS</u> | | | | | | | | |
|------------------------|----|------------------------|----------------|------------|-------------------------|--------------------------|-----------------------------|------------------|--------------------------------|-------------|--|--|--|--|--|--|--|--|--|
| | | | | | | | | | | | Sample Dimensions: <u>1.87 IN</u> Hammer Weight/Drop: <u>140 / 30 IN</u> | | | | | | | | |
| | | | | | | | | | | | Surface Conditions: <u>GRASS</u> | | | | | | | | |
| SOIL DESCRIPTION | | | | | | | | | | | REMARKS | | | | | | | | |
| 16 | 16 | 8 | 15 20 | 24 | 8 | | | CL | | | SAME | | | | | | | | |
| 17 | | 9 | 9 13 | 24 | 12 | | | CL | | | 16-18 SAME | | | | | | | | |
| 18 | 18 | | 21 | | | | | | | | 18-20 SAME | | | | | | | | |
| 19 | | 10 | 3 5 9 | 24 | 8 | | | CL | | | 20-22 SAME | | | | | | | | |
| 20 | 20 | | 13 | | | | | | | | 22-24 SAME | | | | | | | | |
| 21 | | 11 | 6 7 | 24 | 14 | | | CL | | | 24-25.5 GRAY CLAY LOWER PART YELLOW CLAY W/ GRAVEL | | | | | | | | |
| 22 | 22 | | 13 | | | | | | | | 26-28 YELLOW CLAY W/ GRAVEL UP TO 1" | | | | | | | | |
| 23 | | 12 | 3 6 8 | 24 | 16 | | | CL | | | 67% GAS | | | | | | | | |
| 24 | 24 | | 12 | | | | | | | | Σ 27.55 (4-27-88) | | | | | | | | |
| 25 | | 13 | 22 20 | 18 | 10 | | | CL | | | 28-29.5 YELLOW COARSE SAND LOWER PART GRAY COARSE SAND | | | | | | | | |
| 26 | 26 | | 26 17 20 | 24 | 18 | | | CL | | | SATURATED | | | | | | | | |
| 27 | | 14 | 21 | | | | | | | | 30-32 GRAY MEDIUM TO COARSE SAND POORLY GRADED | | | | | | | | |
| 28 | 28 | | 12 15 18 | 18 | 10 | | | SP | | | SATURATED | | | | | | | | |
| 29 | | 15 | 13 19 21 | 24 | 20 | | | SP | | | 32-34 SAME | | | | | | | | |
| 30 | 30 | | 19 | | | | | | | | SATURATED | | | | | | | | |
| 31 | | 16 | 13 15 24 | 24 | 24 | | | SP | | | SATURATED | | | | | | | | |
| 32 | 32 | | 24 | | | | | | | | SATURATED | | | | | | | | |
| 33 | | 17 | 13 | | | | | | | | | | | | | | | | |
| 34 | 34 | | 15 24 | | | | | | | | | | | | | | | | |
| 35 | | | 13 | | | | | | | | | | | | | | | | |

SOIL BORING LOG

(Continued)

 Sheet 3 of 3

 PROJECT: ARLINGTON HEIGHTS LANDFILL 2090 B

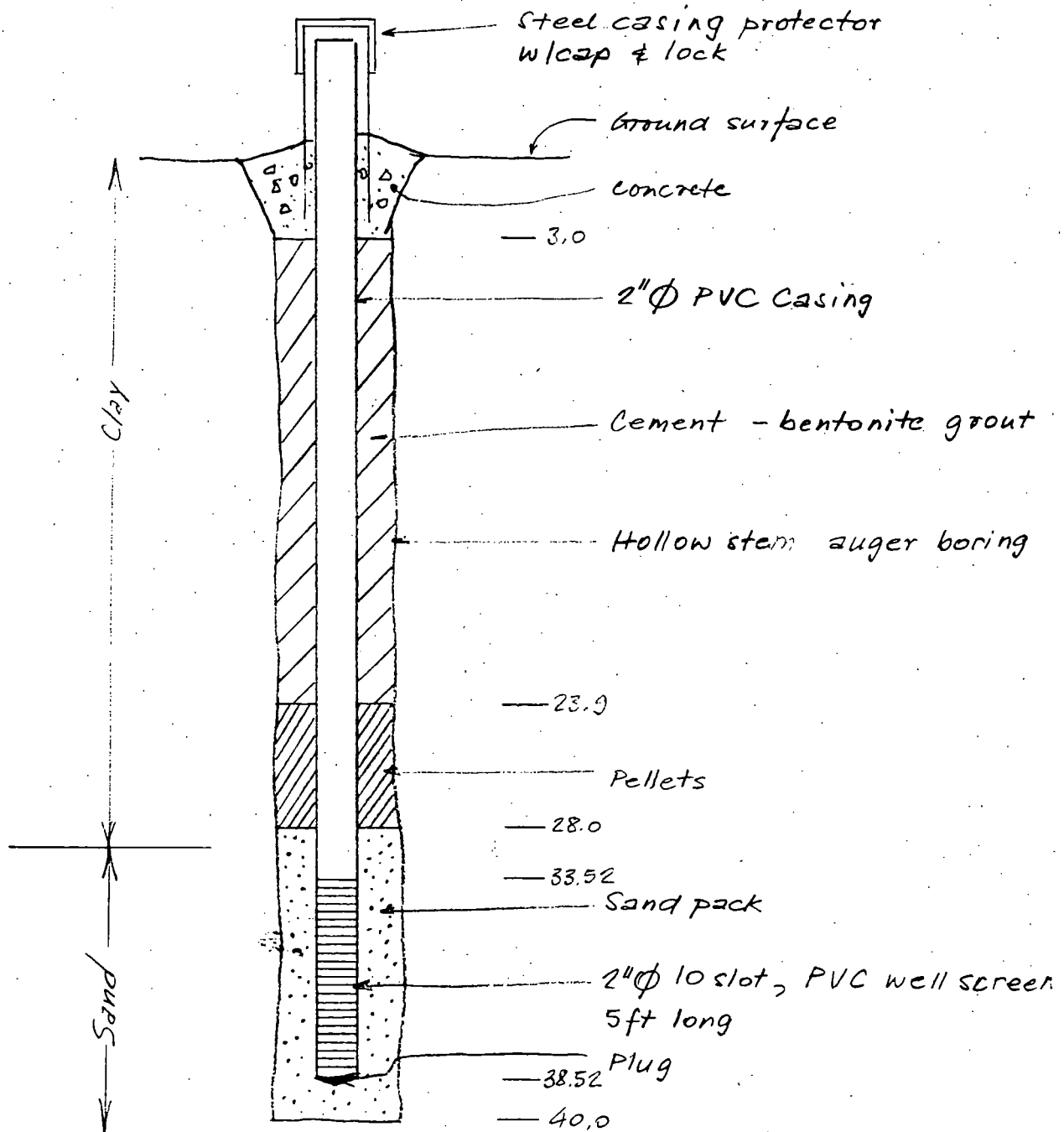
 Boring No.: MW-1

 Drilling Contractor: TSC Logged By: JJP Checked By: PPK Date: 7-28-81

| Boring Depth (ft/m) | Sample Depth (ft/m) | Sample No. | Blows per 6 in/15 cm | Length Driven (in/cm) | Length Recovered (in/cm) | Graphic Recovery | Unified Soil Classification | Graphic Log | Sampling Method(s): | Sample Dimensions: | Hammer Weight/Drop: | Surface Conditions: | SOIL DESCRIPTION | REMARKS |
|---------------------|---------------------|------------|----------------------|-----------------------|--------------------------|------------------|-----------------------------|-------------|-----------------------------------|--------------------|---------------------------|---------------------|---|-----------|
| | | | | | | | | | <u>SPT 24" SPoon - CONTINUOUS</u> | <u>1.37 IN</u> | <u>140</u> / <u>30 IN</u> | <u>GRASS</u> | | |
| 36 | 36 | 18 | 21 32 | 24 | 24 | | SP | | | | | | GRAY MEDIUM TO COARSE SAND POORLY GRADED | |
| 37 | | 19 | 14 19 19 | 24 | 24 | | SP | | | | | | 36-38 SAME | SATURATED |
| 38 | 38 | | 16 | | | | | | | | | | | |
| 39 | | 20 | 22 27 35 | 24 | 24 | | SP | | | | | | 38-40 SAME | SATURATED |
| 40 | 40 | | | | | | | | | | | | EOB 40 FT | |
| | | | | | | | | | | | | | 2" Ø PVC WELL INSTALLED. SCREEN SET 33.5-38.5 FT. | |

SUBJECT MONITORING WELL MW-1
CONSTRUCTION SKETCH
COMPUTED J.T.P. CHECKED W.P.C.

PROJECT ARLINGTON HEIGHTS LANDFILL
FILE NUMBER 2090 B
DATE 5-19-88 Page 1 of 1 Pages

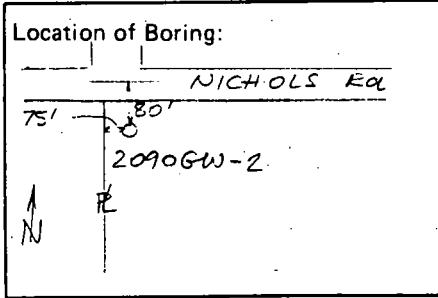


SOIL BORING LOG

Sheet 1 of 2

PROJECT: ARLINGTON HEIGHTS LANDFILL

2090 B



Water Depth: 5.3 5.77
Date: 4-27 5-13
Time: 1020a 0300p
Hole Depth: 13.62 13.5
Casing Depth: _____

Boring No.: MW-2

Feature: NW CORNER

Coordinates: N _____

E _____

Drilling Method (s): H. S. AUGER

Ground Elevation: 88.83*

Casing Elevation: 90.41*

Date Started: 4-27-88 Time: 0830a

Hole/Casing Size (s): 7" BORING

Total Depth: 20.00

Date Completed: 4-27-88 Time: 1015a

2" PVC CASING/SCREEN

Bottom Elevation: 68.83

| Sampling Method (s): <u>SPT 24" SPOON - CONTINUOUS</u> | | | | | | | | | |
|---|---------------------|------------|----------------------|-----------------------|--------------------------|------------------|-----------------------------|-------------|--|
| Sample Dimensions: <u>1.37 IN</u> Hammer Weight/Drop: <u>140</u> / <u>30 IN</u> | | | | | | | | | |
| Surface Conditions: <u>GRASS</u> | | | | | | | | | |
| Boring Depth (ft/m) | Sample Depth (ft/m) | Sample No. | Blows per 6 in/15 cm | Length Driven (in/cm) | Length Recovered (in/cm) | Graphic Recovery | Unified Soil Classification | Graphic Log | REMARKS |
| 1 | | 1 | 6 | 24 | 14 | | CL | | 0-2 TOP SOIL SILTY W/ GRAVEL AND SAND |
| 2 | 2 | | 15 | | | | | | * ARBITRARY SITE DATUM |
| 3 | | 2 | 14 | | | | | | LOWER 10" YELLOW CLAY W/ GRAVEL |
| 4 | 4 | | 12 | | | | | | 2-4 YELLOW CLAY W/ GRAVEL UP TO 1" |
| 5 | | 3 | 6 | | | | | | 4-6 SAME |
| 6 | 6 | | 8 | | | | | | MOIST |
| 7 | | 4 | 11 | 24 | 2 | | | | 7.5.3 (4-27-88) |
| 8 | 8 | | 45 | | | | CL | | 6-8 SILTY SAND W/ GRAVEL UP TO 1" YELLOW, SOME PEBBLES |
| 9 | | 5 | 8 | | | | | | SATURATED |
| 10 | 10 | | 7 | 24 | 10 | | SM | | 8-10 GRAY SAND POORLY GRADED FINE TO MEDIUM W/ GRAVEL UP TO 1/4" |
| 11 | | 6 | 5 | | | | | | SATURATED? |
| 12 | 12 | | 5 | | | | SP | | 10-12 SAME SAND MEDIUM TO COARSE |
| 13 | | 7 | 6 | | | | | | SATURATED |
| 14 | 14 | | 8 | 24 | 24 | | SP | | 12-14 SAME UPPER PART |
| 15 | | | 8 | | | | | | SATURATED |
| | | | 5 | | | | | | LOWER 8" GRAY CLAY |
| | | | 12 | | | | CL | | MOIST |
| | | | 6 | | | | | | 14-16 GRAY PLASTIC CLAY |
| | | | | | | | | | |

Drilling Contractor: TSC Logged By: JJP Checked By: MPK Date: 7-27-88

SOIL BORING LOG

(Continued)

 Sheet 2 of 2

 PROJECT: ARLINGTON HEIGHTS LANDFILL 2090B

 Boring No.: MW-2

 Date: 7-28-88

 Checked By: MMK

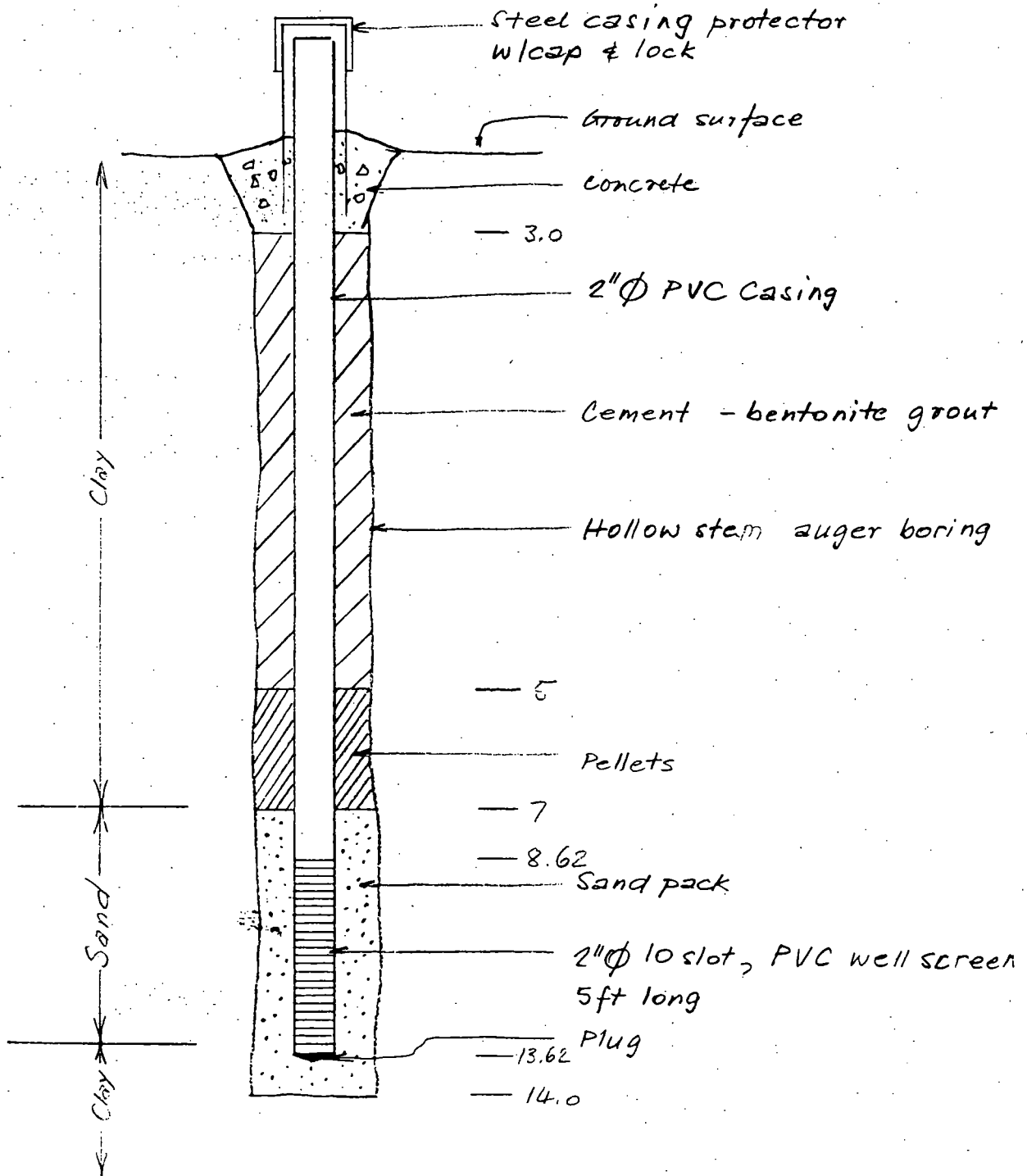
 Logged By: JJP

 Drilling Contractor: TSC

| Boring Depth (ft/m) | Sample Depth (ft/m) | Sample No. | Blows per 6 in/15 cm | Length Driven (in/cm) | Length Recovered (in/cm) | Graphic Recovery | Unified Soil Classification | Graphic Log | Sampling Method(s): | Sample Dimensions: | Hammer Weight/Drop: | Surface Conditions: | SOIL DESCRIPTION | REMARKS |
|---------------------|---------------------|------------|----------------------|-----------------------|--------------------------|------------------|-----------------------------|-------------|--------------------------|--------------------|---------------------|---------------------|--|---------|
| 16 | 16 | 8 | 10 | 24 | 24 | | | | SPT 24" SPOON CONTINUOUS | 1.37 IN | 140 | 30 IN | | |
| 17 | 17 | 9 | 5 | 24 | 20 | | CL | | | | | | 16-18 GRAY PLASTIC CLAY | DRY |
| 18 | 18 | | 13 | | | | | | | | | | | |
| 19 | 19 | 10 | 8 | 24 | 12 | | CL | | | | | | 18-20 SAME | DRY |
| 20 | 20 | | 24 | | | | | | | | | | EOB 20 FT | |
| | | | | | | | | | | | | | 2" Ø PVC WELL INSTALLED SCREEN SET 8.6-13.6 FT. | |

SUBJECT MONITORING WELL MW-2
CONSTRUCTION SKETCH
COMPUTED J.T.P CHECKED WPK

PROJECT ARLINGTON HEIGHTS LANDFILL
FILE NUMBER 2090 B
DATE 5-19-88 Page 1 of 1 Pages

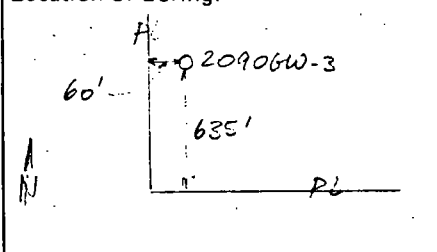


SOIL BORING LOG

 Sheet 1 of 2

 PROJECT: ARLINGTON HEIGHTS LANDFILL
20908

Location of Boring:


 Water Depth: 3.8 3.8
 Date: 4-25 5-13
 Time: 0400p 0930a
 Hole Depth: 15.70 15.70
 Casing Depth: _____

 Boring No.: MW-3

 Feature: WEST SIDE

Coordinates: N _____

E _____

 Drilling Method (s): H. S. AUGER

 Ground Elevation: 92.67*

 Casing Elevation: 94.47*

 Date Started: 4-25-88 Time: 1100a

 Hole/Casing Size (s): 7" BORING

 Total Depth: 24.0

 Date Completed: 4-25-88 Time: 0400p
2" PVC CASING/SCREEN

 Bottom Elevation: 68.67

 Sampling Method (s): SPT 24" SPOON - CONTINUOUS

 Sample Dimensions: 1.37 IN Hammer Weight/Drop: 140 / 30 IN

 Surface Conditions: GRASS

| Boring Depth (ft/m) | Sample Depth (ft/m) | Sample No. | Blows per 6 in/15 cm | Length Driven (in/cm) | Length Recovered (in/cm) | Graphic Recovery | Unified Soil Classification | Graphic Log | SOIL DESCRIPTION | REMARKS |
|---------------------|---------------------|------------|----------------------|-----------------------|--------------------------|------------------|-----------------------------|-------------|--|-----------------------|
| 1 | | 1 | 3 | 24 | 8 | | | | 0-2 TOP SOIL | *ARBITRARY SITE DATUM |
| 2 | 2 | | 7 | | | | | | LOWER 4" BROWN CLAY | |
| 3 | | 2 | 3 | 24 | 6 | | | | 2-4 DARK BROWN CLAY | |
| 4 | 4 | | 3 | | | | | | | |
| 5 | | 3 | 4 | 24 | 6 | | | | 4-6 SAME | |
| 6 | 6 | | 5 | | | | | | | |
| 7 | | 4 | 7 | 24 | 8 | | | | 6-8 DARK BROWN CLAY LOWER PART YELLOW CLAY | |
| 8 | 8 | | 12 | | | | | | | |
| 9 | | 5 | 4 | 24 | 8 | | | | 8-10 YELLOW SANDY CLAY, TRACE FINE SAND SINGLE GRAIN GRAVEL UP TO 1/4" | WET |
| 10 | 10 | | 5 | | | | | | | |
| 11 | | 6 | 6 | 24 | 8 | | | | 10-12 DARK SANDY CLAY W/SINGLE GRAVEL UP TO 1/2" | WET |
| 12 | 12 | | 6 | | | | | | | |
| 13 | | 7 | 10 | 24 | 8 | | | | 12-14 YELLOW DARK GRAY SAND MEDIUM, SOME GRAVEL UP TO 1" | SATURATED |
| 14 | 14 | | 11 | | | | | | | |
| 15 | | | 13 | | | | | | | |
| | | | 23 | | | | | | 14-16 | SATURATED |

 Drilling Contractor: TSC Logged By: JJP Checked By: MPK Date: 7-27-88

PROJECT: ARLINGTON HEIGHTS LANDFILL 2090E

 Boring No.: MW-3

 Date: 7-22-78

 Checked By: DPK

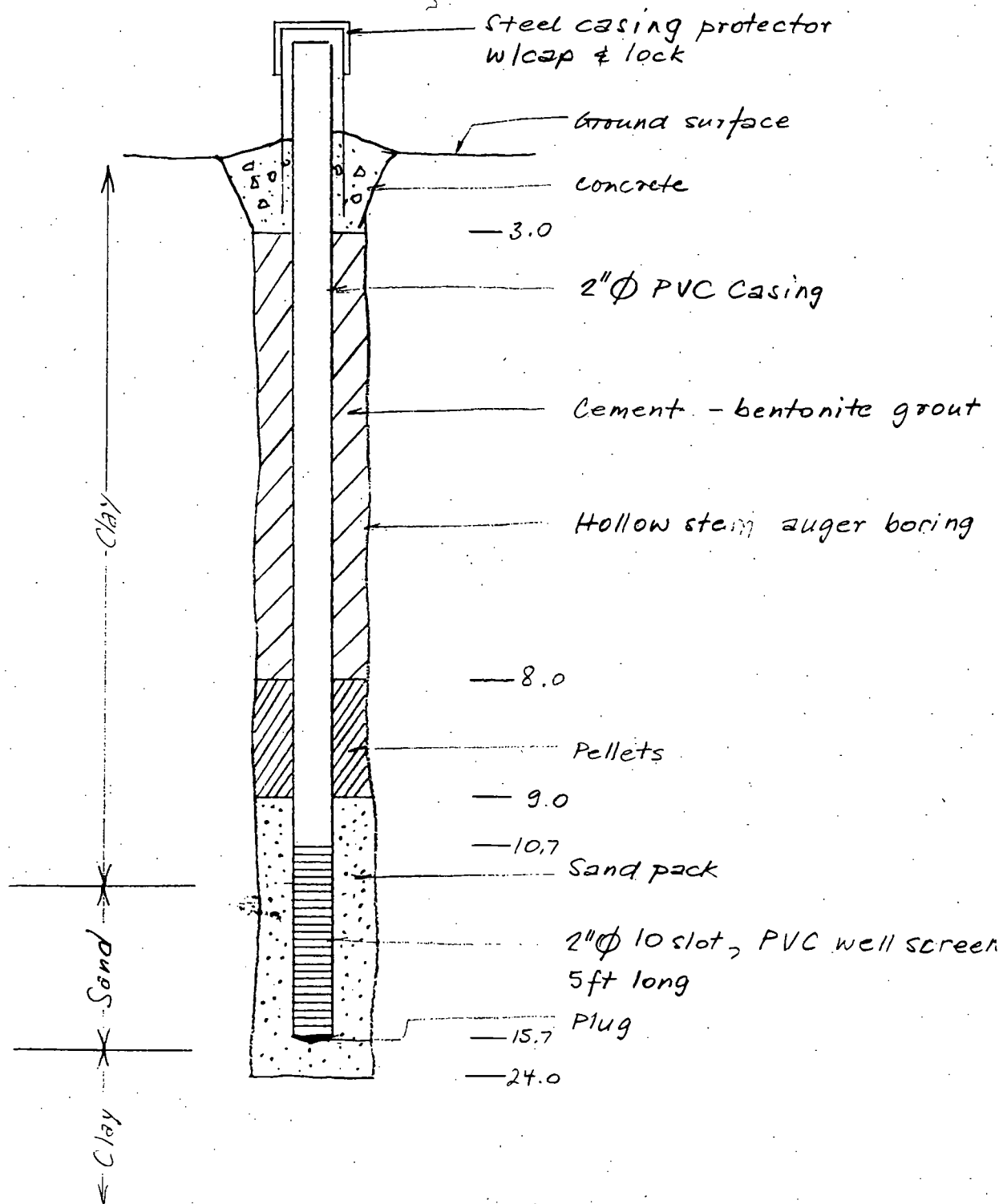
 Logged By: JJP

 Drilling Contractor: TSC

| Boring Depth (ft/m) | Sample Depth (ft/m) | Sample No. | Blows per 6 in/15 cm | Length Driven (in/cm) | Length Recovered (in/cm) | Graphic Recovery | Unified Soil Classification | Graphic Log | Sampling Method(s): | Sample Dimensions: | Hammer Weight/Drop: | Surface Conditions: | SOIL DESCRIPTION | REMARKS |
|---------------------|---------------------|------------|----------------------|-----------------------|--------------------------|------------------|-----------------------------|-------------|---------------------------------|--------------------|---------------------|---------------------|--------------------------|-----------|
| | | | | | | | | | <u>SPT 24' STOOD CONTINUOUS</u> | <u>1.87 IN</u> | <u>140 / 30 IN</u> | <u>GRASS</u> | | |
| 16 | 16 | 8 | 13 | 24 | 10 | | SP | | | | | | MEDIUM GRAY SAND | |
| 17 | | 9 | 5 | | | | | | | | | | 16-18 | SATURATED |
| 18 | 18 | | 8 | 24 | 10 | | SP | | | | | | SAME | |
| 19 | | 10 | 18 | | | | | | | | | | 18-20 GRAY CLAY | DRY |
| 20 | 20 | | 4 | | | | CL | | | | | | 20-22 | |
| 21 | | 11 | 8 | 24 | 10 | | | | | | | | SAME | |
| 22 | 22 | | 15 | | | | CL | | | | | | 22-24 | |
| 23 | | 12 | 22 | | | | | | | | | | SAME | |
| 24 | 24 | | 10 | | | | CL | | | | | | | |
| | | | | | | | | | | | | | EOB 24 FT | |
| | | | | | | | | | | | | | 2" Ø PVC WELL INSTALLED | |
| | | | | | | | | | | | | | SCREEN SET 10.7-15.7 FT. | |

SUBJECT MONITORING WELL MW-3
CONSTRUCTION SKETCH
COMPUTED J.J. P CHECKED WPK

PROJECT ARLINGTON HEIGHTS LANDFILL
FILE NUMBER 2090 B
DATE 5-19-88 Page of Pages



SOIL BORING LOG

 Sheet 1 of 2

 PROJECT: ARLINGTON HEIGHTS LANDFILL
2090 E

Location of Boring:

NICHOLS — A —

60' 0"

20906W = 45'

KENNICOTT AVE.

N

Water Depth: 17.7 17.45

Date: 4-28 5-13

Time: 0330P 0115P

Hole Depth: 81.90 31.55

Casing Depth: _____

 Boring No.: MW-4

 Feature: NE CORNER

Coordinates: N _____

E _____

 Drilling Method (s): H.S. AUGER

 Ground Elevation: 99.62*

 Casing Elevation: 102.52*

 Total Depth: 34.0

 Bottom Elevation: 65.62

 Date Started: 4-28-88 Time: 0900a

 Date Completed: 4-28-88 Time: 0315P

 Hole/Casing Size (s): 7" BORING
2" PVC CASING/SCREEN

 Drilling Contractor: TSC Logged By: JJP Checked By: RPK Date: 7-28-88

| Boring Depth (ft/m) | Sample Depth (ft/m) | Sample No. | Blows per 6 in/15 cm | Length Driven (in/cm) | Length Recovered (in/cm) | Graphic Recovery | Unified Soil Classification | Graphic Log | Sampling Method (s): | Sample Dimensions: | Hammer Weight/Drop: | Surface Conditions: | SOIL DESCRIPTION | REMARKS |
|---------------------|---------------------|------------|----------------------|-----------------------|--------------------------|------------------|-----------------------------|-------------|-----------------------------------|--------------------|---------------------|---------------------|---|------------------------|
| | | | | | | | | | <u>SPT 24" SPOON - CONTINUOUS</u> | <u>1.37 IN</u> | <u>140</u> | <u>30 IN</u> | | |
| | | | | | | | | | | | | | | |
| 1 | | 1 | 6 | 24 | 8 | | | | 0-2 | | | | TOP SOIL 2" DARK YELLOW CLAY | * ARBITRARY SITE DATUM |
| 2 | 2 | | 13 | | | | CL | | 2-4 | | | | BLACK CLAY | |
| 3 | | 2 | 7 | 24 | 12 | | CL | | | | | | | |
| 4 | 4 | | 9 | | | | | | 4-6 | | | | DARK CLAY w/TRACE OF SILT | |
| 5 | | 3 | 6 | 24 | 11 | | CL | | | | | | | |
| 6 | 6 | | 13 | | | | | | 6-8 | | | | DARK CLAY LOWER PART BROWN CLAY | |
| 7 | | 4 | 5 | 24 | 12 | | CL | | | | | | | |
| 8 | 8 | | 10 | | | | | | 8-10 | | | | LIGHT BROWN CLAY TRACE OF SILT AND VERY FINE SAND AND GRAVEL UP TO 1/4" | |
| 9 | | 5 | 7 | 24 | 14 | | CL | | | | | | | |
| 10 | 10 | | 9 | | | | | | 10-12 | | | | SAME | |
| 11 | | 6 | 12 | 24 | 12 | | CL | | | | | | | |
| 12 | 12 | | 17 | | | | | | 12-14 | | | | GRAY CLAY w/POORLY ROUNDED GRAVEL UP TO 1/2" | |
| 13 | | 7 | 11 | 24 | 18 | | CL | | | | | | | |
| 14 | 14 | | 23 | | | | | | 14-16 | | | | | |
| 15 | | | 34 | | | | | | | | | | | |
| | | | 10 | | | | | | | | | | | |
| | | | 14 | | | | CL | | | | | | | |

ES HARZA
ENVIRONMENTAL SERVICES, INC.

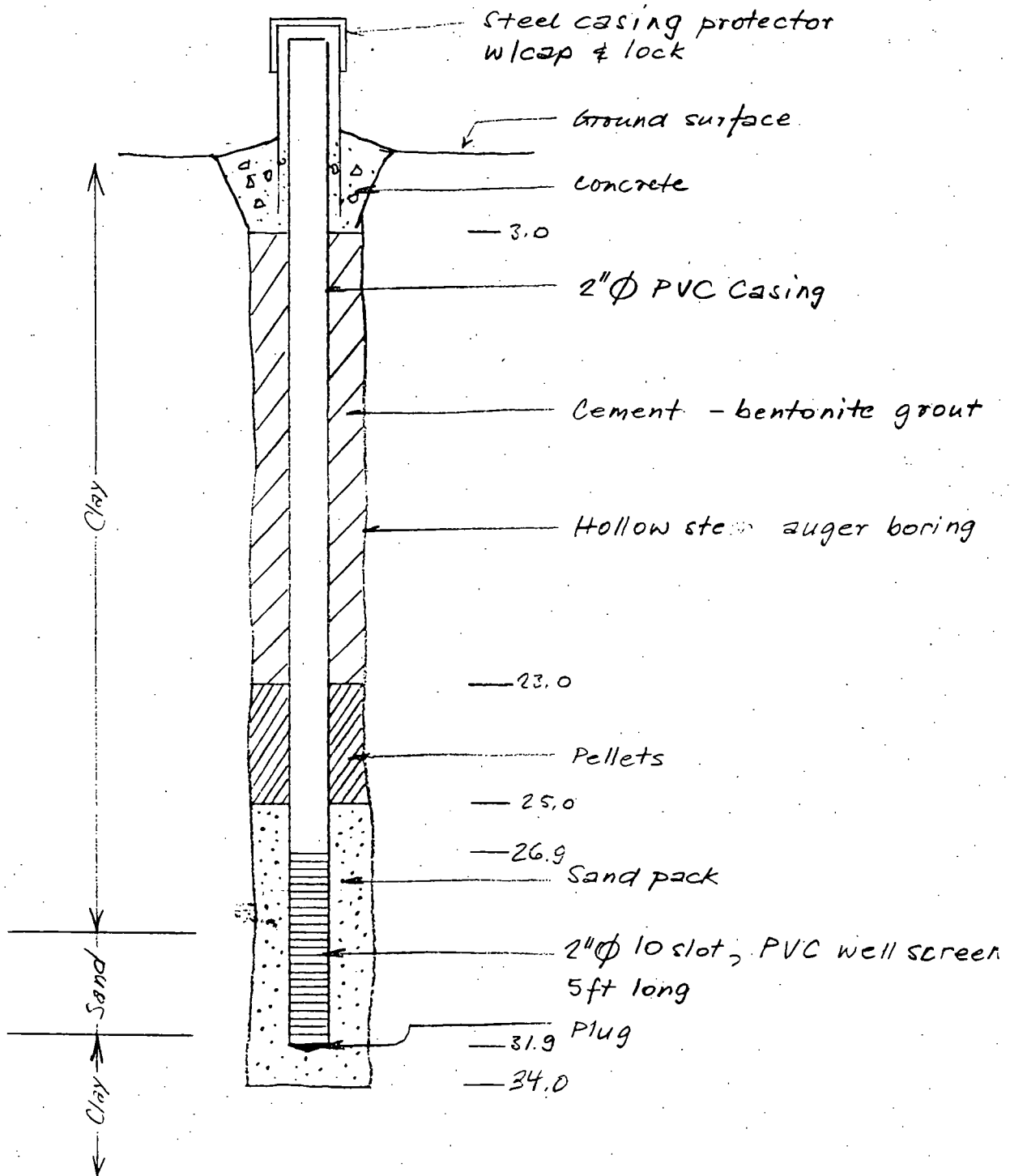
Sheet 2 of 2

Boring No.: MW-4

| Boring Depth (ft/m) | Sample Depth (ft/m) | Sample No. | Blows per 6 in/15 cm | Length Driven (in/cm) | Length Recovered (in/cm) | Graphic Recovery | Unified Soil Classification |
|--|------------------------|------------|-------------------------|--------------------------|-----------------------------|------------------|---|
| Sampling Method(s): SPT 24" SPOON CONTINUOUS | | | | | | | |
| Sample Dimensions: 1.37 IN Hammer Weight/Drop: 140 / 30 IN | | | | | | | |
| Surface Conditions: GRASS | | | | | | | |
| SOIL DESCRIPTION | | | | | | | REMARKS |
| -16-16 | 8 | 22 | 25 | 24 | 20 | CL | GRAY CLAY, LOWER PART SANDY CLAY, FINE SAND |
| -17- | 9 | 10 | 14 | 24 | 22 | CL | 16-18 GRAY CLAY TRACE OF SILT |
| -18-18 | | 27 | | | | | V (4-28-88) 17.7 |
| -19- | 10 | 5 | 9 | 24 | 20 | CL | 18-20 SAME |
| -20-20 | | 17 | | | | | |
| -21- | 11 | 9 | 12 | 24 | 20 | CL | 20-22 SAME |
| -22-22 | | 22 | | | | | |
| -23- | 12 | 7 | 9 | 24 | 20 | CL | 22-24 SAME |
| -24-24 | | 18 | | | | | |
| -25- | 13 | 6 | 9 | 24 | 22 | CL | 24-26 SAME |
| -26-26 | | 19 | | | | | |
| -27- | 14 | 6 | 9 | 24 | 21 | CL | 26-28 SAME |
| -28-28 | | 13 | | | | | |
| -29- | 15 | 11 | 11 | 18 | 18 | CL ML | 28-29.5 GRAY CLAY WET LOWER 2" SILT |
| -30-30 | | 16 | | | | | |
| -31- | 16 | 7 | 8 | 24 | 24 | SW | 30-32 GRAY POORLY GRADED SATURATED SAND LOWER 6" CLAY |
| -32-32 | | 23 | | | | CL | DRY |
| -33- | 17 | 20 | 12 | 24 | 12 | CL | 32-34 GRAY CLAY |
| -34-34 | | 35 | | | | | 2" Ø PVE WELL INSTALLED. SCREEN SET 26.9-31.9 FT. |
| | | | | | | | E O B 34 FT |

SUBJECT MONITORING WELL MW-4
CONSTRUCTION SKETCH
 COMPUTED J.T.P. CHECKED WJK

PROJECT ARLINGTON HEIGHTS LANDFILL
 FILE NUMBER 2090 B
 DATE 5-19-88 Page 1 of 1 Pages



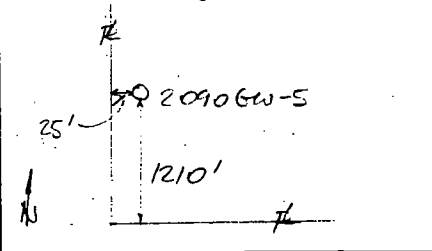
SOIL BORING LOG

Sheet 1 of 2

PROJECT: ARLINGTON HEIGHTS LANDFILL

2090B

Location of Boring:



Water Depth: 5.7 5.1
Date: 4:26 5:13
Time: 0430P 1040a
Hole Depth: 21.50 21.35
Casing Depth: _____

Boring No.: MW-5

Feature: WEST SIDE

Coordinates: N _____

E _____

Drilling Method (s): H.S. AUGER

Ground Elevation: 86.52*

Casing Elevation: 89.02*

Total Depth: 21.50

Bottom Elevation: 65.02

Date Started: 4-26-88 Time: 1255P
Date Completed: 4-26-88 Time: 0430P

Hole/Casing Size (s): 7" BORING

2" PVC CASING/SCREEN

Date: 7-27-88

Checked By: JJP

Logged By: JJP

TSC

Drilling Contractor:

| | | | | | | | Sampling Method (s): <u>SPT 24" SPOON - CONTINUOUS</u> | |
|---------------------|---------------------|------------|----------------------|-----------------------|--------------------------|--|---|-----------------------|
| | | | | | | | Sample Dimensions: <u>1.37 IN</u> Hammer Weight/Drop: <u>140</u> , <u>30 IN</u> | |
| | | | | | | | Surface Conditions: <u>GRASS</u> | |
| Boring Depth (ft/m) | Sample Depth (ft/m) | Sample No. | Blows per 6 in/15 cm | Length Driven (in/cm) | Length Recovered (in/cm) | Graphic Recovery Unified Soil Classification | SOIL DESCRIPTION | REMARKS |
| 1 | | 1 | 4 | 24 | 12 | CL | 0-2 TOP SOIL 3" YELLOW CLAY | *ARBITRARY SITE DATUM |
| 2 | 2 | | 10 | | | | 2-4 YELLOW SANDY CLAY W/GRAVEL UP TO 1" | |
| 3 | | 2 | 7 | 24 | 8 | CL | 4-6 GRAY SAND 8" | MOIST |
| 4 | 4 | | 7 | | | | 6-8 BROWN CLAY | |
| 5 | | 3 | 7 | 24 | 10 | CL | 8-10 GRAY CLAY | |
| 6 | 6 | | 9 | | | | 10-12 SAME | |
| 7 | | 4 | 12 | 24 | 8 | CL | 12-14 SAME | DRY |
| 8 | 8 | | 16 | | | | 14-16 | |
| 9 | | 5 | 8 | 24 | 11 | CL | | |
| 10 | 10 | | 10 | | | | | |
| 11 | | 6 | 11 | 24 | 15 | CL | | |
| 12 | 12 | | 11 | | | | | |
| 13 | | 7 | 6 | 24 | 18 | CL | | |
| 14 | 14 | | 7 | | | | | |
| 15 | | | 10 | | | | | |
| | | | 15 | | | | | |
| | | | 4 | | | | | |
| | | | 5 | | | CM | | |

PROJECT: ARLINGTON HEIGHTS LANDFILL 2090 B

 Boring No.: MW-5

 Date: 7-27-97

 Checked By: MPK

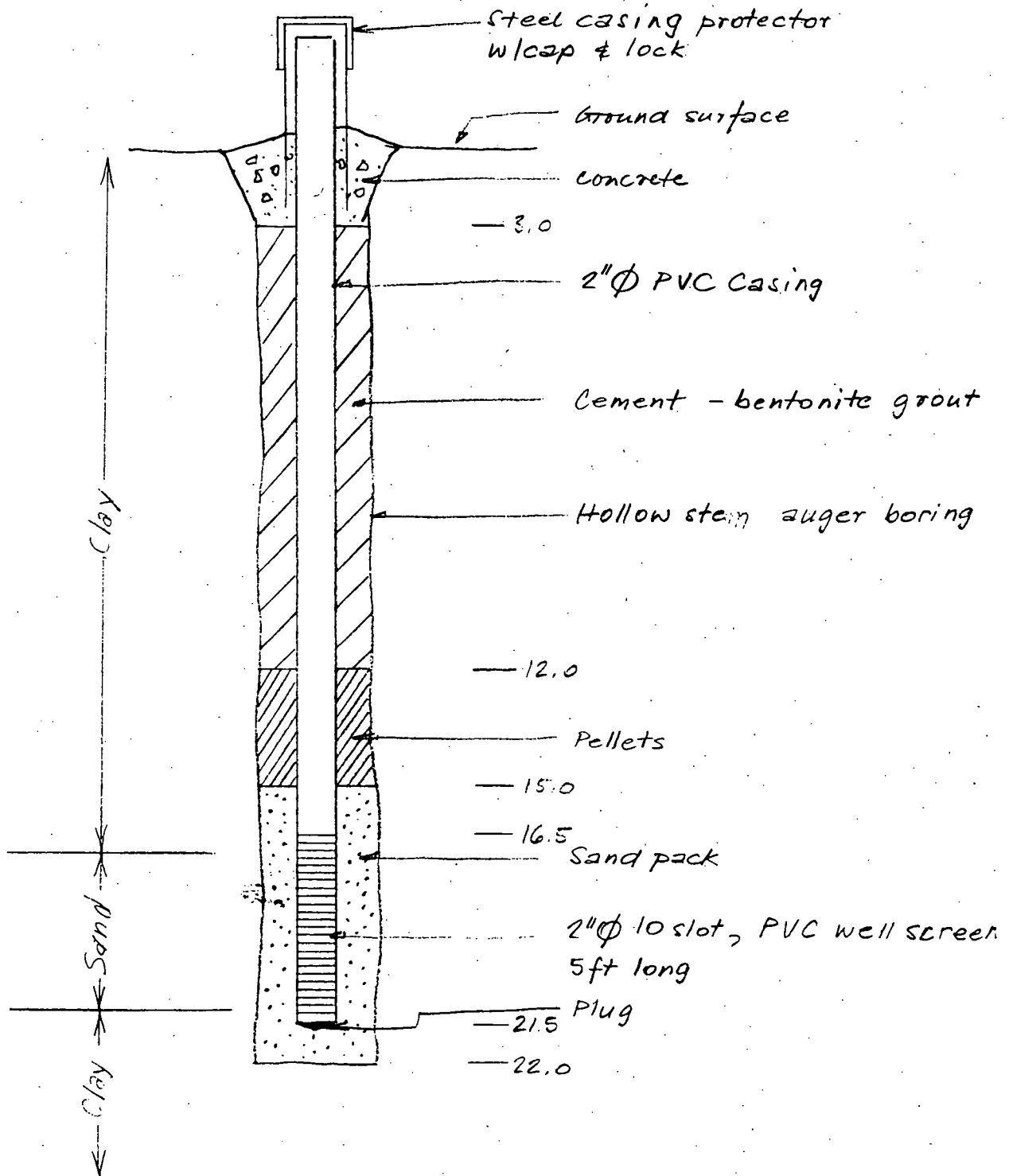
 Logged By: JJP

 Drilling Contractor: TSC

| Boring Depth (ft/m) | Sample Depth (ft/m) | Sample No. | Blows per 6 in/15 cm | Length Driven (in/cm) | Length Recovered (in/cm) | Graphic Recovery | Unified Soil Classification | Graphic Log | Sampling Method(s): | Sample Dimensions: | Hammer Weight/Drop: | Surface Conditions: | SOIL DESCRIPTION | REMARKS |
|------------------------|------------------------|------------|-------------------------|--------------------------|-----------------------------|------------------|--------------------------------|-------------|-----------------------------------|--------------------|---------------------|---------------------|---|-----------|
| | | | | | | | | | <u>SPT 24" SPOON - CONTINUOUS</u> | <u>1.37 IN</u> | <u>140</u> | <u>30 IN</u> | | |
| 16 | 16 | 8 | 9 7 | 24 | 20 | SM CL | | | | | | | GRAY FINE SILTY SAND LOWER PART GRAY CLAY | WET |
| 17 | | 9 | 12 8 10 | 24 | 24 | CL SP | | | | | | | 16-18 GRAY CLAY W/FINE GRAY SAND WELL GRADED | WET |
| 18 | 18 | | 24 18 | | | | | | | | | | 18-19.5 FINE GRAY SAND WELL GRADED | SATURATED |
| 19 | | 10 | 17 29 | 18 | 16 | SP | | | | | | | | |
| 20 | 19.5 20 | | 8 8 | | | | | | | | | | 20-22 GRAY SAND | |
| 21 | | 11 | 17 16 | 24 | 24 | SP CL | | | | | | | LOWER PART SILTY CLAY | DRY |
| 22 | 22 | | | | | | | | | | | | EOB 22 FT | |
| | | | | | | | | | | | | | 2" Ø PVC WELL INSTALLED SCREEN SET 16.5-21.5 FT. | |

SUBJECT MONITORING WELL MW-5
CONSTRUCTION SKETCH
COMPUTED J.T.P. CHECKED MLK

PROJECT ARLINGTON HEIGHTS LANDFILL
FILE NUMBER 2090 B
DATE 5-19-88 Page 1 of 1 Pages



HES HARZA

209DB

Location of Boring:

20906W-6

460'

15'

| | | |
|---------------|-------|-------|
| Water Depth: | 39.5 | 38.5 |
| Date: | 5-3 | 5-13 |
| Time: | 0930a | 0830a |
| Hole Depth: | 43.8 | 43.7 |
| Casing Depth: | | |

E _____

Bottom Elevation: 74.15

Date 5-3-88 Time: 0930a

2" PVC CASING/SCREEN

REMARKS

| Sampling Method (s): | | | | | | | | | | SPT 24" SPOON- CONTINUOUS | | | | | | | | | |
|---|--|--|--|--|--|--|--|--|--|---|--|--|--|--|--|--|--|--|--|
| Sample Dimensions: | | | | | | | | | | 1.37 IN Hammer Weight/Drop: 140 / 30 IN | | | | | | | | | |
| Surface Conditions: | | | | | | | | | | GRASS | | | | | | | | | |
| SOIL DESCRIPTION | | | | | | | | | | REMARKS | | | | | | | | | |
| 0-2 TOP SOIL | | | | | | | | | | * ARBITRARY SITE DATUM | | | | | | | | | |
| 2-4 DARK CLAY W/ MEDIUM SAND AND GRAVEL | | | | | | | | | | | | | | | | | | | |
| 4-6 DARK CLAY | | | | | | | | | | | | | | | | | | | |
| 6-8 YELLOW CLAY | | | | | | | | | | | | | | | | | | | |
| 8-10 SAME | | | | | | | | | | | | | | | | | | | |
| 10-11 DARK GRAY CLAY WITH BOULDER | | | | | | | | | | | | | | | | | | | |
| 12-14 DARK CLAY | | | | | | | | | | | | | | | | | | | |
| 14-16 | | | | | | | | | | | | | | | | | | | |

Drilling Contractor: TSC Logged By: JJP Checked By: JPK Date: 7-27-88

| Boring Depth (ft/m) | | Sample Depth (ft/m) | Sample No. | Blows per 6 in/15 cm | Length Driven (in/cm) | Length Recovered (in/cm) | Graphic Recovery | Unified Soil Classification | Graphic Log | SOIL DESCRIPTION | REMARKS |
|---|----|---------------------|----------------------------|----------------------|-----------------------|--------------------------|------------------|-----------------------------|-------------|--|----------|
| Sampling Method(s): <u>SPT 24" SPOON CONTINUOUS</u> Sample Dimensions: <u>1.37 IN</u> Hammer Weight/Drop: <u>140 / 30 IN</u> Surface Conditions: <u>GRASS</u> | | | | | | | | | | | |
| 16 | 16 | 8 | 12 11 | 24 | 12 | | CL | | | GRAY CLAY | |
| 17 | 17 | 9 | 10 9 14 | 24 | 12 | | CL | | | 16-18 SAME | |
| 18 | 18 | 10 | 29 12 17 20 21 | 24 | 0 | | | | | NO SAMPLE | |
| 20 | 20 | 11 | 15 18 19 | 18 | 16 | | CL | | | 20-21.5 GRAY CLAY | |
| 22 | 22 | 12 | 8 9 13 | 18 | 10 | | CL | | | 22-23.5 GRAY CLAY SOME COARSE SAND AND GRAVEL UP TO 1/2" | |
| 24 | 24 | 13 | 7 10 10 13 | 24 | 18 | | SM CL | | | 24-26 UPPER PART (1 FT) GRAY SILTY SAND LOWER PART GRAY CLAY | |
| 26 | 26 | 14 | 7 11 12 18 | 24 | 10 | | CL | | | 26-28 GRAY CLAY | 10% GAS |
| 28 | 28 | 15 | 8 9 12 | 18 | 12 | | CL | | | 28-29.5 SAME | 2.5% GAS |
| 30 | 30 | 16 | 6 11 14 15 | 24 | 18 | | CL | | | 30-32 SAME | 17% GAS |
| 32 | 32 | 17 | 7 9 13 14 | 24 | 18 | | CL | | | 32-34 SAME | 23% GAS |
| 34 | 34 | 18 | 12 19 | 18 | 6 | | | | | 34-35.5 GRAY CLAY | 28% GAS |

SOIL BORING LOG

(Continued)

 Sheet 3 of 3

 PROJECT: ARLINGTON HEIGHTS LANDFILL 2090B

 Boring No.: MW-6

 Date: 7-28-88

 Checked By: DNK

 Logged By: JJP

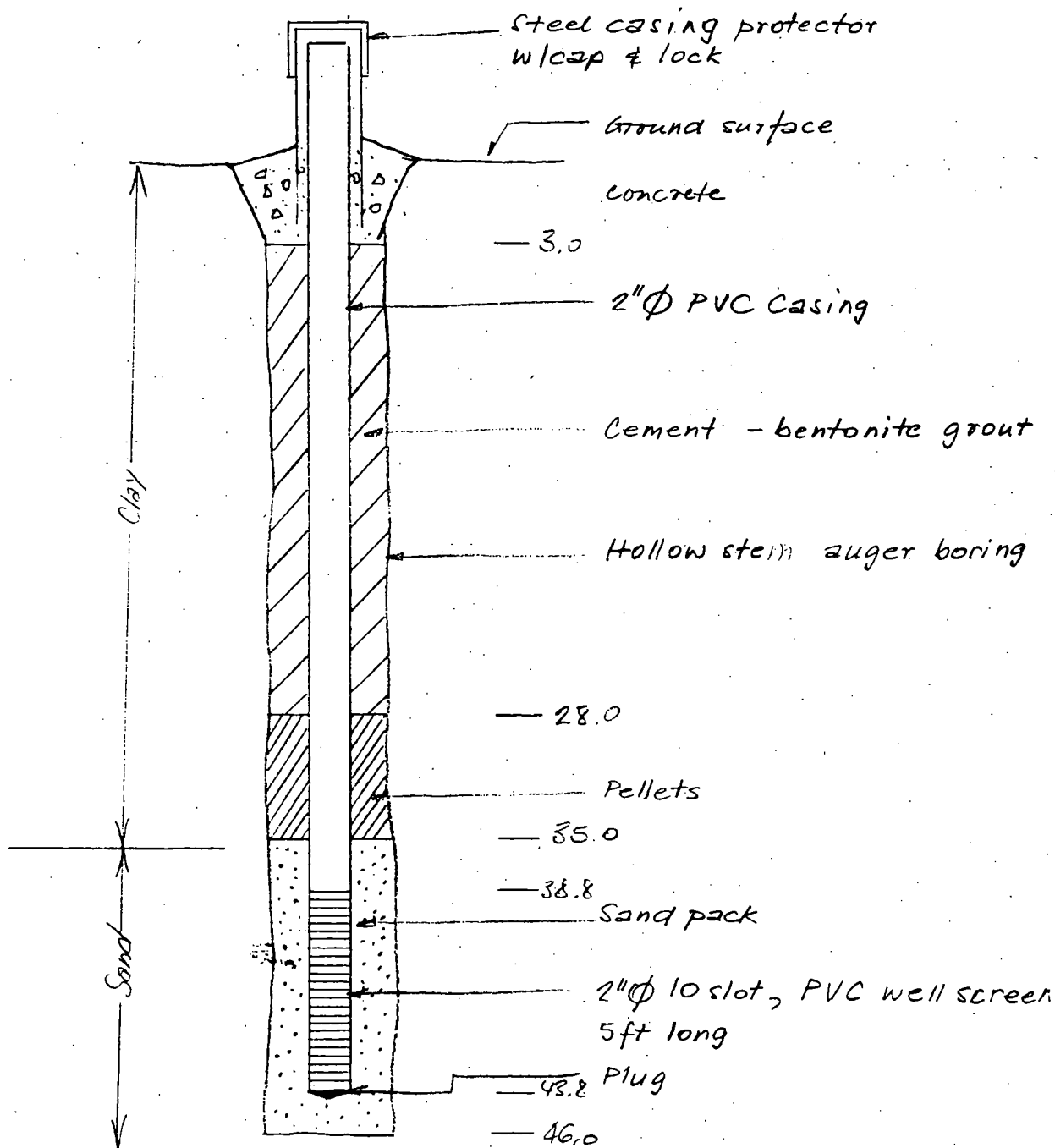
TSC

Drilling Contractor:

| Boring Depth (ft/m) | Sample Depth (ft/m) | Sample No. | Blows per 6 in/15 cm | Length Driven (in/cm) | Length Recovered (in/cm) | Graphic Recovery | Unified Soil Classification | Graphic Log | Sampling Method(s): | Sample Dimensions: | Hammer Weight/Drop: | Surface Conditions: | SOIL DESCRIPTION | REMARKS |
|---------------------|---------------------|------------|----------------------|-----------------------|--------------------------|------------------|-----------------------------|-------------|---------------------------------|--------------------|---------------------------|---------------------|--|------------------------------------|
| | | | | | | | | | <u>SPT 24" SPOON CONTINUOUS</u> | <u>1.37 IN</u> | <u>140</u> / <u>30 IN</u> | <u>GRASS</u> | | |
| 35.5 | 36 | 19 | 37 | 24 | 18 | 16 | SP | | | | | | 36-37.5 MEDIUM TO COARSE SAND W/BOULDERS | 21% GAS |
| 37 | 38 | 20 | 19 | 19 | 24 | 24 | SM | | | | | | 38-40 GRAY SAND MEDIUM TO COARSE POORLY GRADED SOME SILT IN MIDDLE PART (6") | 22% GAS |
| 40 | 41 | 21 | 11 | 19 | 11 | 24 | SP | | | | | | 40-42 GRAY SAND MEDIUM TO COARSE WITH GRAVEL UP TO 1/2" | 39.5 (5-3-88) SATURATED 22% GAS |
| 42 | 43 | 22 | 8 | 11 | 11 | 24 | SP | | | | | | 42-44 GRAY COARSE SAND AND GRAVEL | SATURATED 21% GAS |
| 44 | 45 | 23 | 17 | 25 | 19 | 19 | SP | | | | | | 44-46 SAME | SATURATED |
| 46 | 46 | | | | | | | | | | | | FOR 46 FT | |
| | | | | | | | | | | | | | 2" Ø PVC WELL INSTALLED SCREEN SET 38.8-43.8 FT. | |

SUBJECT MONITORING WELL MW-6
CONSTRUCTION SKETCH
COMPUTED J.T. P CHECKED _____

PROJECT ARLINGTON HEIGHTS LANDFILL
FILE NUMBER 2090 B
DATE 5-19-88 Page 1 of 1 Pages

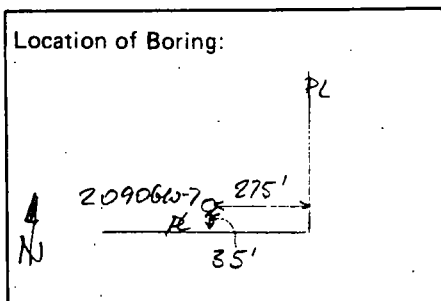


SOIL BORING LOG

Sheet 1 of 3

PROJECT: ARLINGTON HEIGHTS LANDFILL

2090E



Water Depth: 32.5 32.5
 Date: 5-6 5-13
 Time: 0430p 0730a
 Hole Depth: 47.55 47.5
 Casing Depth: _____

Boring No.: MW-7

Feature: SOUTH SIDE

Coordinates: N _____

E _____

Drilling Method (s): # S. AUGER

Ground Elevation: 113.15 *

Casing Elevation: 115.40 *

Date Started: 5-6-88 Time: 0815a

Hole/Casing Size (s): 7" BORING.

Total Depth: 48.0

Date Completed: 5-6-88 Time: 0420p

2" PVC CASING/SCREEN

Bottom Elevation: 65.15

Sampling Method (s): SPT 24" SPOON - CONTINUOUS

Sample Dimensions: 1.27 IN Hammer Weight/Drop: 140 / 30 IN

Surface Conditions: GRASS

| Boring Depth (ft/m) | Sample Depth (ft/m) | Sample No. | Blows per 6 in/15 cm | Length Driven (in/cm) | Length Recovered (in/cm) | Graphic Recovery | Unified Soil Classification | Graphic Log | SOIL DESCRIPTION | REMARKS |
|---------------------|---------------------|------------|----------------------|-----------------------|--------------------------|------------------|-----------------------------|-------------|---------------------------------------|------------------------|
| 1 | | 1 | 5 | 24 | 10 | | | | 0-2 TOP SOIL 4" | * ARBITRARY SITE DATUM |
| | | | 6 | | | | | | 6" BROWN CLAY | |
| 2 | 2 | | 11 | | | | CL | | 2-4 BROWN CLAY W/SILT AND SOME GRAVEL | |
| 3 | | 2 | 5 | 24 | 20 | | CL | | | |
| 4 | 4 | | 13 | | | | | | 4-6 HARD BROWN CLAY | |
| 5 | | 3 | 12 | 24 | 12 | | CL | | | |
| 6 | 6 | | 13 | | | | | | 6-8 | SAME |
| 7 | | 4 | 14 | 24 | 16 | | CL | | | |
| 8 | 8 | | 21 | | | | | | 8-10 | HARD GRAY CLAY |
| 9 | | 5 | 29 | 24 | 15 | | CL | | | |
| 10 | 10 | | 8 | | | | | | 10-12 | |
| 11 | | 6 | 9 | 24 | 14 | | CL | | | SAME |
| 12 | 12 | | 16 | | | | | | 12-14 | |
| 13 | | 7 | 10 | 24 | 10 | | CL | | | SAME |
| 14 | 14 | | 11 | | | | | | | |
| 15 | | | 12 | | | | | | | |
| | | | 11 | | | | | | | |

Date: 7-28-88

PPK

Checked By:

JJP

Logged By:

TSC

Drilling Contractor:

| Boring Depth (ft/m) | Sample Depth (ft/m) | Sample No. | Blows per 6 in/15 cm | Length Driven (in/cm) | Length Recovered (in/cm) | Graphic Recovery | Unified Soil Classification | Graphic Log | Sampling Method(s): <u>SPT 24' SPOON</u> | |
|------------------------|------------------------|------------|-------------------------|--------------------------|-----------------------------|------------------|--------------------------------|-------------|---|---------|
| | | | | | | | | | Sample Dimensions: <u>1-37 IN</u> Hammer Weight/Drop: <u>140</u> / <u>30 IN</u> | |
| | | | | | | | | | Surface Conditions: <u>GRASS</u> | |
| | | | | | | | | | SOIL DESCRIPTION | REMARKS |
| 16 | 16 | 8 | 13 16 | 24 | 11 | | CL | | GRAY CLAY | |
| 17 | 17.5 | 9 | 11 8 11 | 18 | 6 | | CL | | 16-17.5 SAME | |
| 18 | 18 | | | | | | | | 18-20 GRAY SILT | |
| 19 | | 10 | 5 8 9 | 24 | 18 | | ML | | | |
| 20 | 20 | | 10 9 | | | | | | 20-21.5 | |
| 21 | 21.5 | 11 | 9 9 6 | 18 | 18 | | ML | | SAME | |
| 22 | 22 | | | | | | | | 22-24 GRAY SILTY CLAY w/GRAVEL UP TO 1/2" | |
| 23 | | 12 | 4 5 7 | 24 | 19 | | CL | | | |
| 24 | 24 | | 10 11 | | | | | | 24-25.5 | |
| 25 | 25.5 | 13 | 8 9 | 18 | 18 | | CL | | SAME | |
| 26 | 26 | | | | | | | | 26-27.5 GRAY SILTY CLAY | |
| 27 | 27.5 | 14 | 6 8 11 | 18 | 18 | | CL | | | |
| 28 | 28 | | | | | | | | 28-30 | |
| 29 | | 15 | 5 6 8 | 24 | 19 | | CL | | SAME | |
| 30 | 30 | | 10 7 | | | | | | 30-31.5 | |
| 31 | 31.5 | 16 | 10 12 | 18 | 15 | | CL | | SAME | |
| 32 | 32 | | | | | | | | 32-33.5 | |
| 33 | 33.5 | 17 | 7 11 12 | 18 | 18 | | CL | | SAME w/SOME GRAVEL | |
| 34 | 34 | | | | | | | | | |
| 35 | | | 8 10 | | | | | | | |

SOIL BORING LOG

(Continued)

Sheet 3 of 3

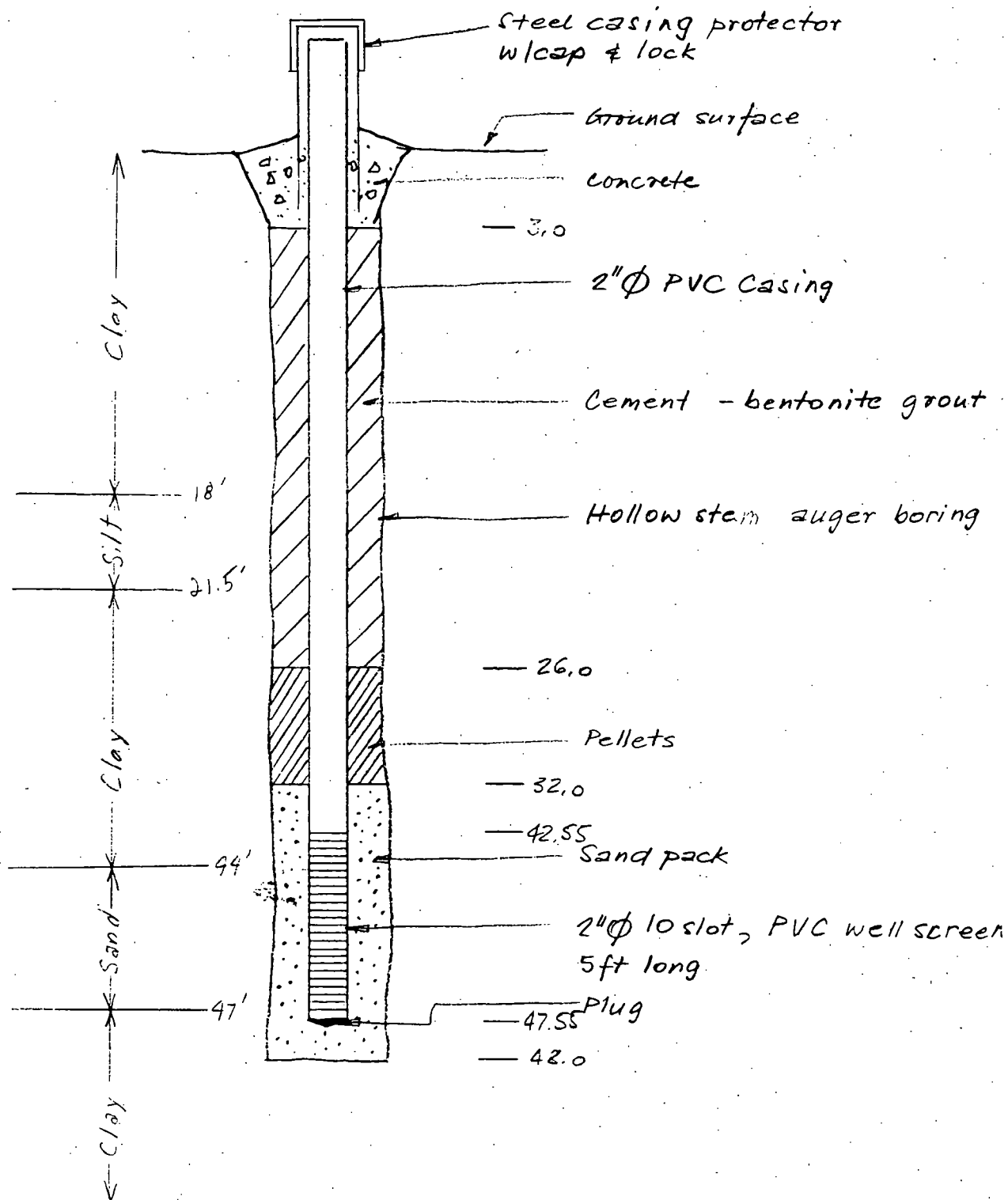
PROJECT: ARLINGTON HEIGHTS LANDFILL 2090B

Boring No.: MW-7

| Boring Log | | | | | | | | | | Sampling Method(s): <u>SPT 24" SPOON CONTINUOUS</u> | |
|--|----|----|----------------|----|----|--|----------|--|--|---|--|
| Sample Dimensions: <u>1.37 IN</u> Hammer Weight/Drop: <u>140 / 30 IN</u> | | | | | | | | | | | |
| Surface Conditions: <u>GRASS</u> | | | | | | | | | | | |
| SOIL DESCRIPTION | | | | | | | | | | REMARKS | |
| 36 | 36 | 18 | 11 12 | 24 | 8 | | CL | | GRAY SILTY CLAY | | |
| 37 | 37 | 19 | 4 4 10 | 24 | 22 | | CL | | 36-38 SAME | | |
| 38 | 38 | | 13 | | | | | | | | |
| 39 | 39 | 20 | 4 5 10 | 24 | 22 | | CL | | 38-40 SAME | | |
| 40 | 40 | | 14 | | | | | | | | |
| 41 | 41 | 21 | 6 5 12 | 24 | 22 | | CL | | 40-42 GRAY CLAY | | |
| 42 | 42 | | 14 | | | | | | | | |
| 43 | 43 | 22 | 3 3 58 | 24 | 22 | | CL | | 42-44 GRAY CLAY | DRY | |
| 44 | 44 | | 21 | | | | ML | | LOWER 6" GRAY SILT | MOIST | |
| 45 | 45 | 23 | 10 13 19 | 24 | 24 | | SP | | 44-46 GRAY MEDIUM TO COARSE SAND | SATURATED | |
| 46 | 46 | | 15 | | | | | | | | |
| 47 | 47 | 24 | 12 16 21 | 18 | 18 | | SP CL | | 46-47.5 GRAY MEDIUM TO COARSE SAND LOWER 6" GRAY CLAY | MOIST | |
| 48 | 48 | | | | | | | | | | |
| EOB 48 FT | | | | | | | | | | | |
| 2" Ø PVC WELL INSTALLED SCREEN SET 42.6-47.6 FT | | | | | | | | | | | |

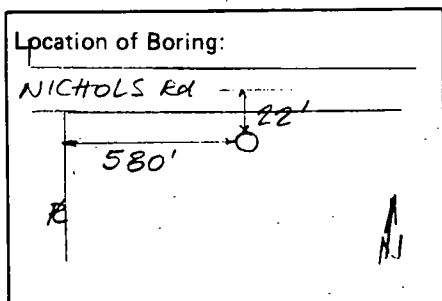
SUBJECT MONITORING WELL MW-7
CONSTRUCTION SKETCH
COMPUTED J.T.P CHECKED WPK

PROJECT ARLINGTON HEIGHTS LANDFILL
FILE NUMBER 2090 B
DATE 5-19-88 Page 1 of 1 Pages



SOIL BORING LOG

 Sheet 1 of 2

 PROJECT: ARLINGTON HEIGHTS LANDFILL 2090B


Water Depth: 16.0 16.5
 Date: 5-4 5-13
 Time: 0320p 0200p
 Hole Depth: 22.35 22.3
 Casing Depth: _____

Boring No.: MW-8
 Feature: NORTH SIDE
 Coordinates: N _____
 E _____

Drilling Method (s): H.S. AUGER
 Ground Elevation: 98.65 *
 Casing Elevation: 101.1 *
 Total Depth: 24.0
 Bottom Elevation: 74.65

Date Started: 5-4-88 Time: 0915a
 Date Completed: 5-4-88 Time: 0810p

Hole/Casing Size (s): 7" BORING
2" PVC CASING/SCREEN

| Sampling Method (s): <u>SPT 24" SPOON CONTINUOUS</u> | | | | | | | | | |
|---|---------------------|------------|----------------------|-----------------------|--------------------------|------------------|-----------------------------|-------------|--|
| Sample Dimensions: <u>1.37 IN</u> Hammer Weight/Drop: <u>140, 30 IN</u> | | | | | | | | | |
| Surface Conditions: <u>GRASS</u> | | | | | | | | | |
| Boring Depth (ft/m) | Sample Depth (ft/m) | Sample No. | Blows per 6 in/15 cm | Length Driven (in/cm) | Length Recovered (in/cm) | Graphic Recovery | Unified Soil Classification | Graphic Log | SOIL DESCRIPTION |
| 1 | | 1 | 4 | 24 | 7 | | CL | | 0-2 TOP SOIL 3" |
| 2 | 2 | 2 | 5 | 24 | 12 | | CL | | 4" CLAY W/SAND AND SILT |
| 3 | | 2 | 6 | 24 | 12 | | CL | | 2-4 BROWN CLAY W/GRAVEL UP TO 1/4" |
| 4 | 4 | 3 | 5 | 24 | 12 | | CL | | 4-6 SAME |
| 5 | | 3 | 5 | 24 | 12 | | CL | | 6-8 SAME |
| 6 | 6 | 4 | 2 | 24 | 12 | | CL | | 8-10 SAME |
| 7 | | 4 | 2 | 24 | 12 | | CL | | 10-12 BROWN SANDY SILT W/FINE SAND AND GRAVEL UP TO 1/4" |
| 8 | 8 | 5 | 4 | 24 | 11 | | CL | | 12-14 UPPER PART (1 FT) LIGHT SATID FINE TO MEDIUM W/BROWN FINE SAND AND GRAVEL UP TO 1/2" |
| 9 | | 5 | 6 | 24 | 11 | | CL | | LOWER PART COARSE SAND W/BROWN SPOTS |
| 10 | 10 | 6 | 10 | 24 | 10 | | SP | | |
| 11 | | 6 | 12 | 24 | 10 | | SP | | |
| 12 | 12 | 7 | 11 | 24 | 13 | | SP | | |
| 13 | | 7 | 13 | 24 | 13 | | SP | | |
| 14 | 14 | | 15 | | | | | | |
| 15 | | | 24 | | | | | | |
| 16 | | | 22 | | | | | | |

* ARBITRARY SITE DATUM

MOIST

WET

MOIST

WET

SATURATED

SATURATED

Drilling Contractor: TSC Logged By: JJP Checked By: DK Date: 7-28-88

SOIL BORING LOG

(Continued)

 Sheet 2 of 2

 PROJECT: ARLINGTON HEIGHTS LANDFILL 2090B

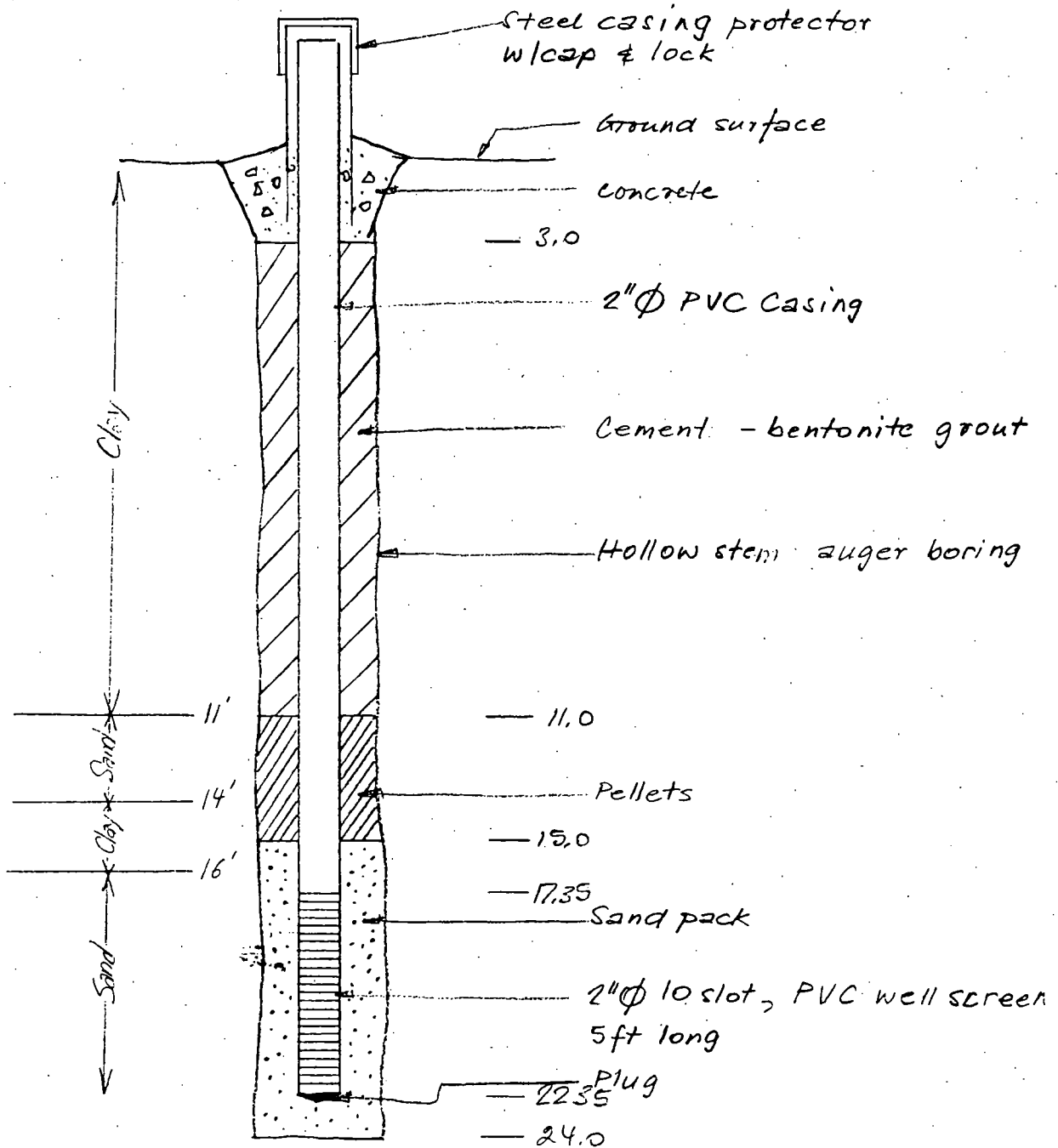
 Boring No.: MW-8

 Drilling Contractor: TSC Date: 7-27-87 Checked By: WPK Logged By: JJP

| Boring Depth (ft/m) | Sample Depth (ft/m) | Sample No. | Blows per 6 in/15 cm | Length Driven (in/cm) | Length Recovered (in/cm) | Graphic Recovery | Unified Soil Classification | Graphic Log | Sampling Method(s): | Sample Dimensions: | Hammer Weight/Drop: | Surface Conditions: | SOIL DESCRIPTION | REMARKS |
|------------------------|------------------------|------------|-------------------------|--------------------------|-----------------------------|------------------|--------------------------------|-------------|---------------------------------|--------------------|---------------------------|---------------------|---|------------------------------|
| | | | | | | | | | <u>SPT 24" SPOON CONTINUOUS</u> | <u>1.37 IN</u> | <u>140</u> / <u>50 IN</u> | <u>GRASS</u> | | |
| 16 | 16 | 8 | 19 18 | 24 | 12 | | CL | | | | | | BROWN CLAY W/BOULDER | DRY |
| 17 | 17 | 9 | 6 7 9 | 24 | 22 | | SP | | | | | | 16-18 BROWN AND BLACK SAND MEDIUM TO COARSE POORLY GRADED | 7 (5-4-88) 16.0 SATURATED |
| 18 | 18 | | 11 | | | | | | | | | | | |
| 19 | 19.5 | 10 | 8 10 22 | 18 | 16 | | SP | | | | | | 18-19.5 WHITE COARSE SAND AND GRAVEL UP TO 1/4" | SATURATED |
| 20 | 20 | | | | | | | | | | | | | |
| 21 | 21 | 11 | 8 14 18 | 24 | 24 | | SP | | | | | | 20-22 SAME | SATURATED |
| 22 | 22 | | 24 | | | | | | | | | | | |
| 23 | 23 | 12 | 29 21 21 26 | 24 | 24 | | SP | | | | | | 22-24 SAME | SATURATED |
| 24 | 24 | | | | | | | | | | | | | |
| | | | | | | | | | | | | | EOB 24 FT | |
| | | | | | | | | | | | | | 2" Ø PVC WELL INSTALLED SCREEN SET 17.4-22.4 FT. | |

SUBJECT MONITORING WELL MW-8
CONSTRUCTION SKETCH
COMPUTED J.T.P. CHECKED APL

PROJECT ARLINGTON HEIGHTS LANDFILL
FILE NUMBER 2090 B
DATE 5-19-88 Page 1 of 1 Pages



Appendix B

Laboratory Soils Test Reports



TESTING SERVICE CORPORATION

457 EAST GUNDERSEN DR. • CAROL STREAM, ILLINOIS 60188-2492

June 27, 1988

HARZA ENVIRONMENTAL SERVICES, INC.
150 South Wacker Drive
Chicago, Illinois 60606-4288

Attention: Mr. Farrukh M. Mazher

Dr. Lawrence A. DuBose, P.E., S.E. *President*
Charles C. Luther, P.E. *Executive Vice-President*
Bruce R. Poynor *Engineering Geologist, V.P.*
Charles R. DuBose, P.E., V.P.
Thomas J. Morris, P.E., V.P.
Scott B. Stueland, P.E.
Allen L. DuBose *Director of Marketing*
Telephone 312 653-3920

Received 6/30/88
1-11

RE: L - 25,441
SOIL TESTING PROGRAM
ARLINGTON HEIGHTS LANDFILL
2090B

Dear Mr. Mazher:

We have completed laboratory testing on the above mentioned project. This information is on the enclosed Soil Test Data sheets. The water contents of alternate samples of cohesive material in the monitoring well bore holes is included in the following table.

| BORING | SAMPLE | WATER CONTENT | BORING | SAMPLE | WATER CONTENT |
|--------|--------|---------------|--------|--------|---------------|
| 1 | 1 | 33.9 | 5 | 7 | 14.0 |
| 1 | 3 | 19.0 | 5 | 9 | 17.9 |
| 1 | 5 | 15.9 | 5 | 11 | 15.6 |
| 1 | 7 | 15.6 | 6 | 1 | 25.0 |
| 1 | 9 | 12.0 | 6 | 3 | 22.6 |
| 1 | 11 | 14.0 | 6 | 5 | 16.5 |
| 1 | 13 | 11.5 | 6 | 7 | 14.6 |
| 2 | 1 | 16.5 | 6 | 9 | 14.9 |
| 2 | 3 | 21.6 | 6 | 11 | 15.4 |
| 2 | 7 | 16.7 | 6 | 13 | 14.5 |
| 2 | 9 | 18.1 | 6 | 14 | 13.8 |
| 3 | 1 | 20.9 | 6 | 15 | 14.9 |
| 3 | 3 | 22.7 | 6 | 17 | 13.4 |
| 3 | 7 | 12.3 | 7 | 1 | 26.6 |
| 3 | 9 | 15.2 | 7 | 3 | 19.0 |
| 3 | 10 | 12.4 | 7 | 5 | 18.7 |
| 3 | 12 | 16.1 | 7 | 7 | 16.2 |
| 4 | 1 | 20.8 | 7 | 9 | 17.6 |
| 4 | 3 | 33.9 | 7 | 12 | 14.4 |
| 4 | 5 | 15.0 | 7 | 14 | 9.8 |
| 4 | 7 | 13.9 | 7 | 15 | 17.8 |
| 4 | 9 | 12.7 | 7 | 16 | 15.5 |
| 4 | 11 | 15.2 | 7 | 18 | 15.2 |
| 4 | 13 | 13.4 | 7 | 19 | 15.9 |
| 4 | 15 | 23.9 | 7 | 21 | 14.3 |
| 4 | 17 | 15.1 | 7 | 23 | 13.7 |
| 5 | 1 | 13.3 | 8 | 1 | 21.8 |
| 5 | 3 | 15.9 | 8 | 3 | 17.3 |
| 5 | 5 | 14.5 | 8 | 5 | 17.5 |
| 5 | 6 | 15.0 | 8 | 8 | 12.4 |
| | | | 8 | 11 | 13.1 |

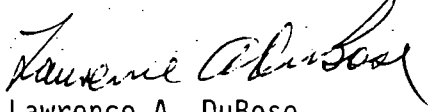
HARZA ENVIRONMENTAL SERVICES, INC.
Chicago, Illinois

L - 25,441
June 23, 1988
Page Two

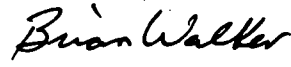
It has been a pleasure to assist you with this work. Please call if there are questions or if we can be of further service.

Respectfully submitted,

TESTING SERVICE CORPORATION


Lawrence A. DuBose
President

Prepared By:


Brian Walker
Geologist

LAD:BW:tmc

Enclosures

CLIENT: HARZA ENVIRONMENTAL SERVICES

JOB NUMBER: 25,441

DATE: JUNE 27, 1988

PROJECT: ARLINGTON HEIGHTS LANDFILL

SOIL TEST DATA

| LAB NUMBER | | | | | |
|-----------------------------------|-------|-------|----------|----------|-------|
| BORING NUMBER | SB-1 | SB-2 | SB-2 | SB-2 | SB-3 |
| SAMPLE NUMBER | 1 | 1 TOP | 1 MIDDLE | 1 BOTTOM | 2 |
| DEPTH IN FEET | 1-2.5 | 1-2.5 | 1-2.5 | 1-2.5 | 3.5-5 |
| HRB CLASSIFICATION & GROUP INDEX | OL | OH | OL | CL | CL |
| GRAIN SIZE CLASSIFICATION | | | | | |
| GRADATION--PASSING 1" SIEVE % | | | | | |
| GRADATION--PASSING 3/4" SIEVE % | | | | | |
| GRADATION--PASSING 3/8" SIEVE % | 100 | | | | 100 |
| GRADATION--PASSING NO.4 SIEVE % | 98 | | 100 | 100 | 99 |
| GRADATION--PASSING NO.10 SIEVE % | 95 | | 98 | 98 | 98 |
| GRADATION--PASSING NO.40 SIEVE % | 89 | | 93 | 83 | 91 |
| GRADATION--PASSING NO.100 SIEVE % | 80 | | 86 | 70 | 83 |
| GRADATION--PASSING NO.200 SIEVE % | 76 | | 83 | 65 | 80 |
| SAND % | 24 | | 17 | 36 | 20 |
| SILT % | 34 | | 40 | 28 | 32 |
| CLAY % (.005 mm) | 42 | | 43 | 37 | 48 |
| LIQUID LIMIT % | 51 | | | 54 | 47 |
| PLASTICITY INDEX % | 27 | | | 25 | 25 |
| UNCONFINED COMPRESSION STRENGTH | 3.45 | | 1.69 | 4.37 | 2.29 |
| STANDARD DRY DENSITY | | | | | |
| AASHTO T-99 PCF | 100.8 | 84.8 | 100.6 | 118.8 | 104.5 |
| OPTIMUM MOISTURE % | 22.3 | 29.0 | 18.4 | 13.7 | 22.7 |

REMARKS:

CLIENT: HARZA ENVIRONMENTAL SERVICES

JOB NUMBER: 25,441

DATE: JUNE 23, 1988

PROJECT: ARLINGTON HEIGHTS LANDFILL

SOIL TEST DATA

| | | | | | |
|-----------------------------------|--------|----------|-------|--------|-------|
| LAB NUMBER | | | | | |
| BORING NUMBER | SB-3 | SB-3 | SB-4 | SB-4 | GW-1 |
| SAMPLE NUMBER | 4 TOP | 4 BOTTOM | 2 | 4 | 7 |
| DEPTH IN FEET | 8.5-10 | 8.5-10 | 3.5-5 | 8.5-10 | 12-14 |
| HRB CLASSIFICATION & GROUP INDEX | OL | CL | OL | CL | CL |
| GRAIN SIZE CLASSIFICATION | | | | | |
| GRADATION--PASSING 1" SIEVE % | | | | | |
| GRADATION--PASSING 3/4" SIEVE % | | | | | 100 |
| GRADATION--PASSING 3/8" SIEVE % | | | | 100 | 91 |
| GRADATION--PASSING NO.4 SIEVE % | | | | 98 | 91 |
| GRADATION--PASSING NO.10 SIEVE % | | | 100 | 96 | 89 |
| GRADATION--PASSING NO.40 SIEVE % | | | 97 | 85 | 81 |
| GRADATION--PASSING NO.100 SIEVE % | | | 93 | 74 | 75 |
| GRADATION--PASSING NO.200 SIEVE % | | | 91 | 70 | 72 |
| SAND % | | | 9 | 30 | 28 |
| SILT % | | | 42 | 35 | 34 |
| CLAY % | | | 49 | 35 | 38 |
| LIQUID LIMIT % | | | 54 | 42 | 30 |
| PLASTICITY INDEX % | | | 32 | 23 | 16 |
| UNCONFINED COMPRESSION STRENGTH | 2.00 | 2.69 | 1.77 | 2.36 | |
| STANDARD DRY DENSITY | | | | | |
| AASHTO T-99 PCF | 98.6 | 112.8 | 95.4 | 111.2 | |
| OPTIMUM MOISTURE % | 22.1 | 17.9 | 28.4 | 17.6 | 15.6 |

REMARKS:

CLIENT: HARZA ENVIRONMENTAL SERVICES

JOB NUMBER: 25,441

DATE: JUNE 27, 1988

PROJECT: ARLINGTON HEIGHTS LANDFILL

S O I L T E S T D A T A

| | | | | | |
|---|-------|-------|-------|-------|-------|
| LAB NUMBER | | | | | |
| BORING NUMBER | GW-1 | GW-2 | GW-2 | GW-3 | GW-3 |
| SAMPLE NUMBER | 17 | 6 | 9 | 8 | 10 |
| DEPTH IN FEET | 32-34 | 10-12 | 16-18 | 14-16 | 18-20 |
| HRB CLASSIFICATION & GROUP INDEX | | | CL | | CL |
| GRAIN SIZE CLASSIFICATION | | | | | |
| GRADATION--PASSING 1" SIEVE % | | | | | |
| GRADATION--PASSING 3/4" SIEVE % | 100 | 100 | | 100 | |
| GRADATION--PASSING 3/8" SIEVE % | 84 | 93 | | 98 | |
| GRADATION--PASSING NO.4 SIEVE % | 69 | 87 | | 94 | |
| GRADATION--PASSING NO.10 SIEVE % | 48 | 76 | | 86 | |
| GRADATION--PASSING NO.40 SIEVE % | 17 | 24 | | 74 | |
| GRADATION--PASSING NO.100 SIEVE % | 11 | 17 | | 38 | |
| GRADATION--PASSING NO.200 SIEVE % | 9 | 14 | | 28 | |
| SAND % | | | | | |
| SILT % | | | | | |
| CLAY % | | | | | |
| LIQUID LIMIT % | | | 34 | | 27 |
| PLASTICITY INDEX % | | | 19 | | 13 |
| BEARING RATIO % | | | | | |
| STANDARD DRY DENSITY AASHTO T-99 PCF | | | | | |
| OPTIMUM MOISTURE % | | | 18.1 | | 12.4 |

REMARKS:

CLIENT: HARZA ENVIRONMENTAL SERVICES

JOB NUMBER: 25,441

DATE: JUNE 23, 1988

PROJECT: ARLINGTON HEIGHTS LANDFILL

SOIL TEST DATA

| LAB NUMBER | | | | | |
|---|-------|-------|-------|-------|-------|
| BORING NUMBER | GW-4 | GW-5 | GW-5 | GW-6 | GW-6 |
| SAMPLE NUMBER | 11 | 6 | 10 | 14 | 21 |
| DEPTH IN FEET | 20-22 | 10-12 | 18-20 | 26-28 | 40-42 |
| HRB CLASSIFICATION & GROUP INDEX | CL | CL | | CL | |
| GRAIN SIZE CLASSIFICATION | | | | | |
| GRADATION--PASSING 1" SIEVE % | | | | | |
| GRADATION--PASSING 3/4" SIEVE % | | | | | 100 |
| GRADATION--PASSING 3/8" SIEVE % | 100 | | | | 87 |
| GRADATION--PASSING NO.4 SIEVE % | 98 | | | | 80 |
| GRADATION--PASSING NO.10 SIEVE % | 92 | | | | 69 |
| GRADATION--PASSING NO.40 SIEVE % | 86 | | 100 | | 45 |
| GRADATION--PASSING NO.100 SIEVE % | 80 | | 90 | | 14 |
| GRADATION--PASSING NO.200 SIEVE % | 77 | | 39 | | 10 |
| SAND % | 23 | | | | |
| SILT % | 38 | | | | |
| CLAY % .005 mm | 39 | | | | |
| LIQUID LIMIT % | 28 | 27 | | 24 | |
| PLASTICITY INDEX % | 14 | 13 | | 11 | |
| BEARING RATIO % | | | | | |
| STANDARD DRY DENSITY AASHTO T-99 PCF | | | | | |
| OPTIMUM MOISTURE % | 15.2 | 15.0 | | 13.8 | |

REMARKS:

CLIENT: HARZA ENVIRONMENTAL SERVICES

JOB NUMBER: 25,441

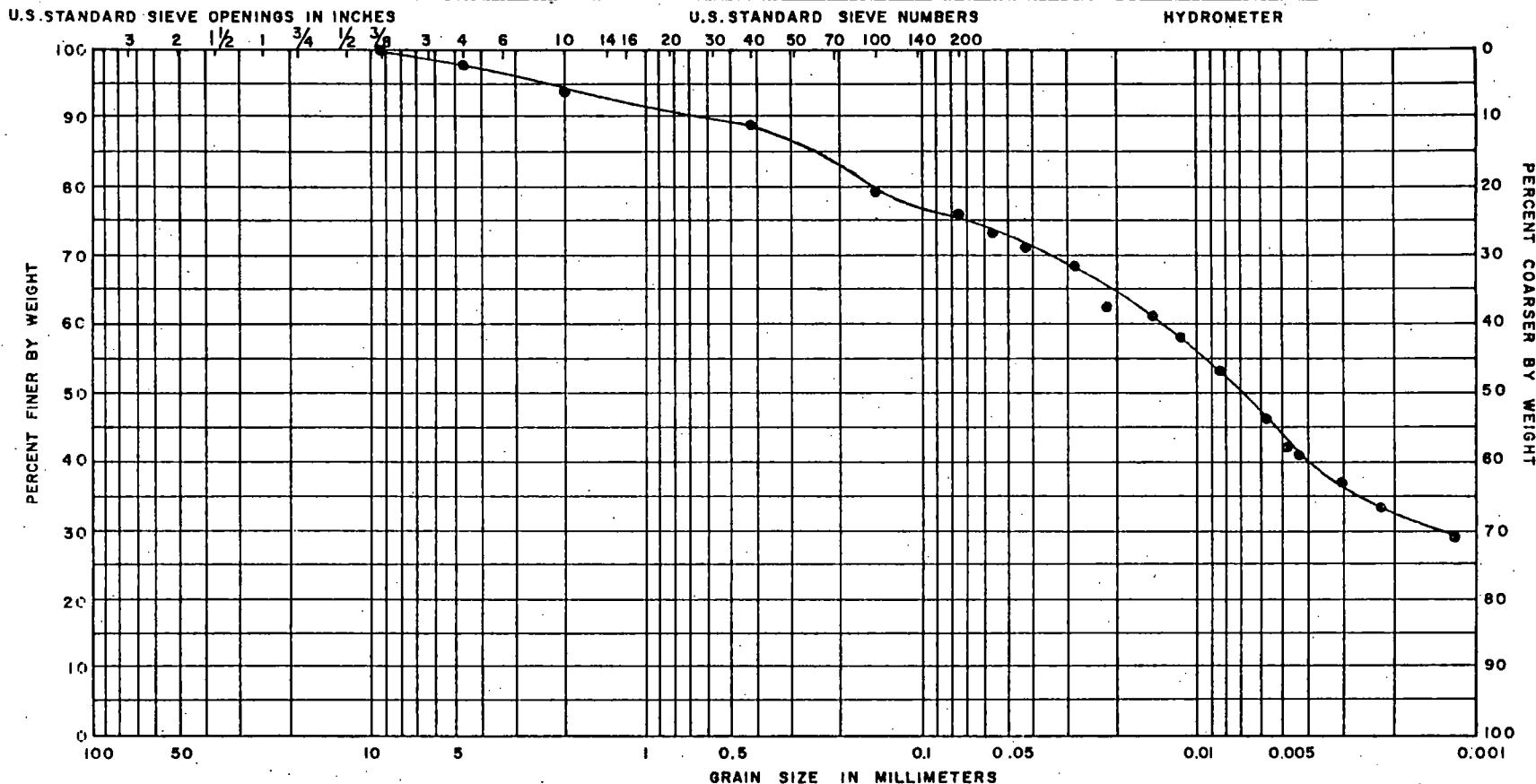
DATE: JUNE 23, 1988

PROJECT: ARLINGTON HEIGHTS LANDFILL

SOIL TEST DATA

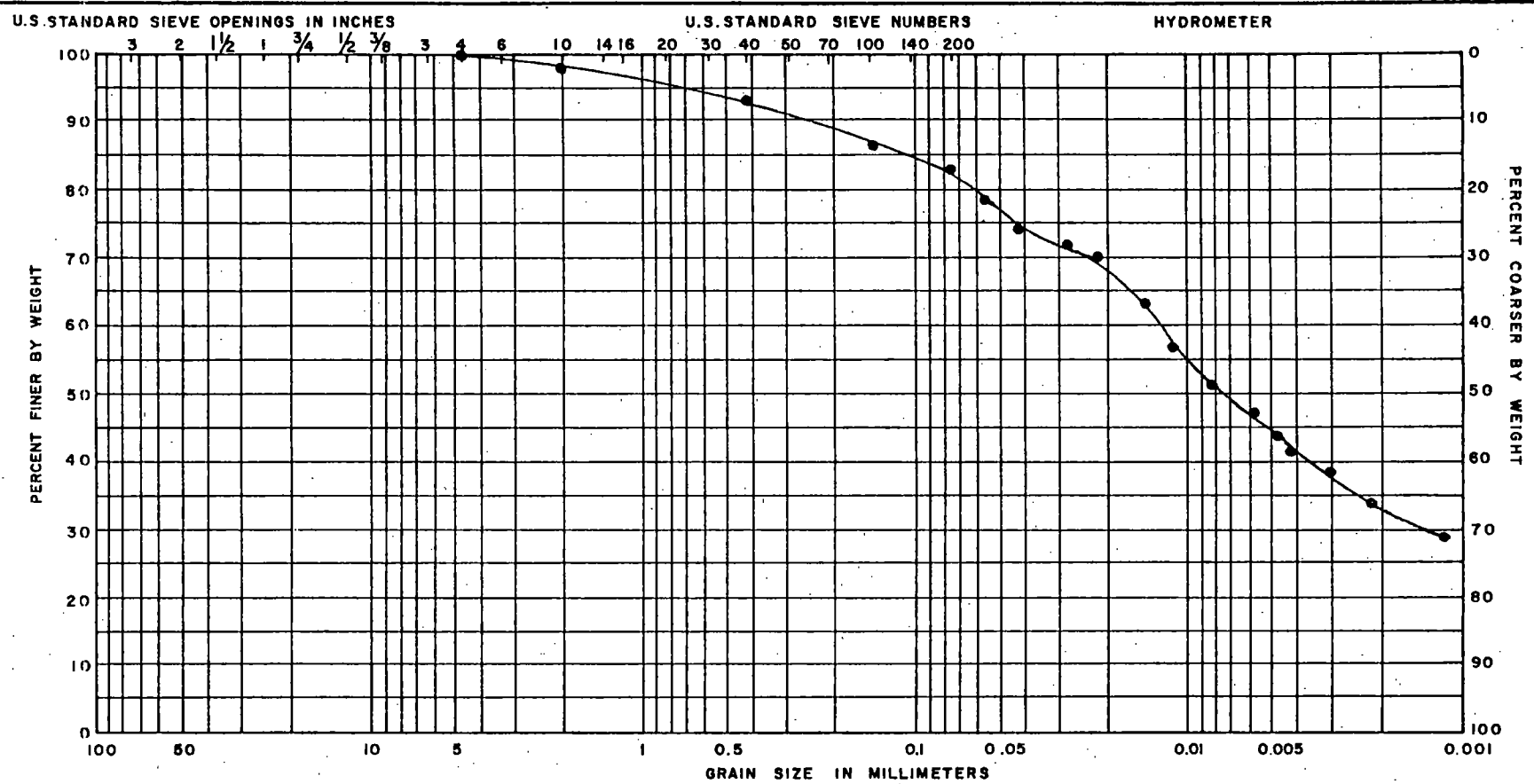
| | | | | | |
|---|-------|-------|------|---------|--|
| LAB NUMBER | | | | | |
| BORING NUMBER | CW-7 | CW-7 | CW-8 | CW-8 | |
| SAMPLE NUMBER | 15 | 23 | 5 | 10 | |
| DEPTH IN FEET | 28-30 | 44-46 | 8-10 | 18-19.5 | |
| HRB CLASSIFICATION & GROUP INDEX | CL | CL | CL | | |
| GRAIN SIZE CLASSIFICATION | | | | | |
| GRADATION--PASSING 1" SIEVE % | | | | 100 | |
| GRADATION--PASSING 3/4" SIEVE % | | | | 88 | |
| GRADATION--PASSING 3/8" SIEVE % | | 100 | | 70 | |
| GRADATION--PASSING NO.4 SIEVE % | | 97 | | 57 | |
| GRADATION--PASSING NO.10 SIEVE % | | 95 | | 40 | |
| GRADATION--PASSING NO.40 SIEVE % | | 89 | | 15 | |
| GRADATION--PASSING NO.100 SIEVE % | | 84 | | 10 | |
| GRADATION--PASSING NO.200 SIEVE % | | 81 | | 8 | |
| SAND % | | | | | |
| SILT % | | | | | |
| CLAY % | | | | | |
| LIQUID LIMIT % | 26 | | 54 | | |
| PLASTICITY INDEX % | 12 | | 32 | | |
| BEARING RATIO % | | | | | |
| STANDARD DRY DENSITY AASHTO T-99 PCF | | | | | |
| OPTIMUM MOISTURE % | 17.8 | | 17.5 | | |

REMARKS:



25,441
 13-7
 1-2 1/2

GRAIN SIZE ANALYSIS



| | | | | | | |
|---------|--------|--|--------|------|--------------|------|
| UNIFIED | GRAVEL | | SAND | | SILT OR CLAY | |
| A ASHO | GRAVEL | | COARSE | FINE | SILT | CLAY |

| NUMBER | DEPTH | W | W _L | W _P | CLASSIFICATION |
|--------|-------------|---|----------------|----------------|----------------|
| SB-2 | 1-2 1/2 TOP | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

TESTING SERVICE CORPORATION
 457 EAST GUNDERSEN DRIVE
 CAROL STREAM, ILLINOIS 60188
 L - 25,441

U.S. STANDARD SIEVE OPENINGS IN INCHES

U.S. STANDARD SIEVE NUMBERS

HYDROMETER

PERCENT FINER BY WEIGHT

PERCENT COARSER BY WEIGHT

GRAIN SIZE IN MILLIMETERS

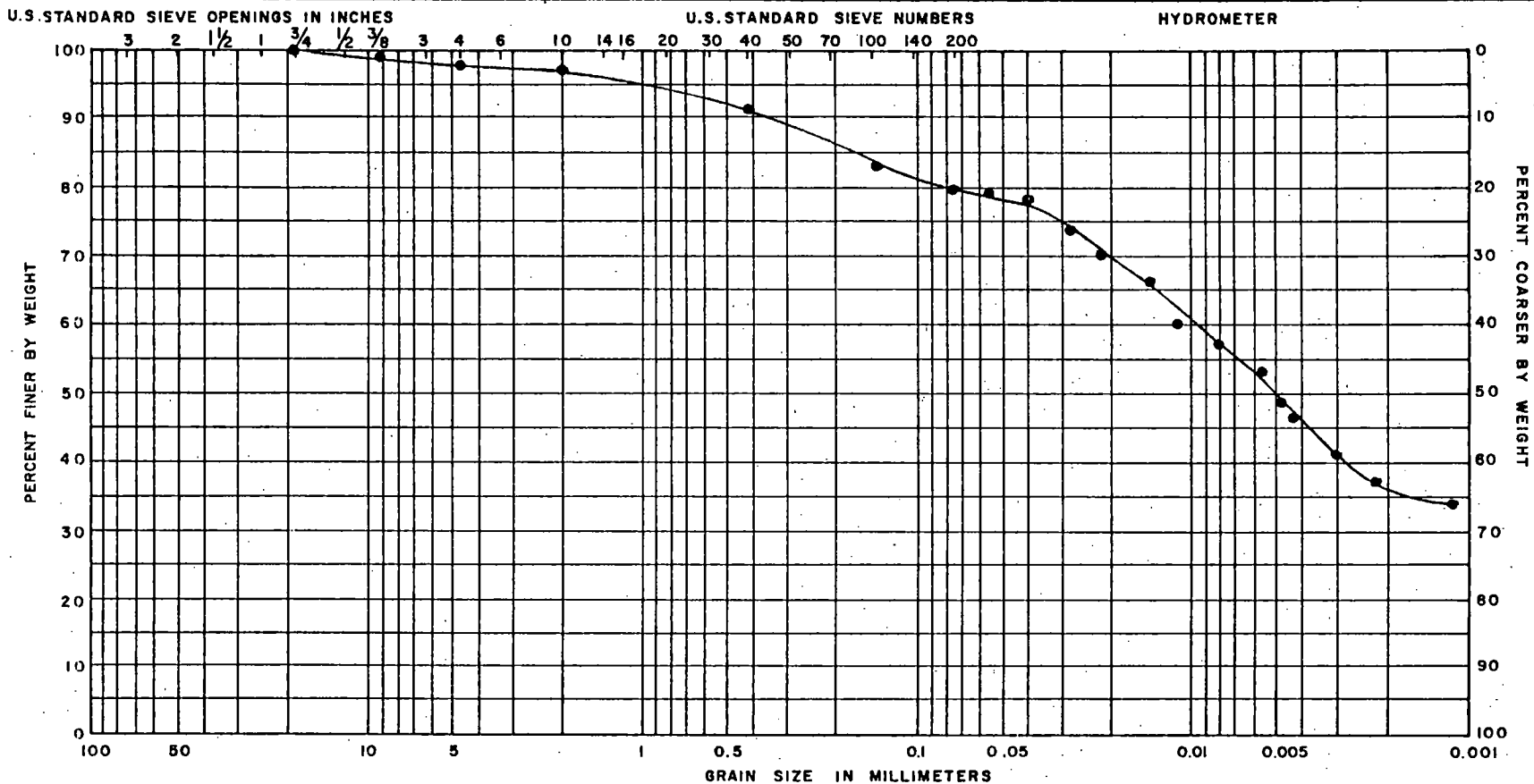
| UNIFIED | GRAVEL | | SAND | | SILT OR CLAY | |
|---------|--------|--|--------|------|--------------|------|
| A ASHO | GRAVEL | | COARSE | FINE | SILT | CLAY |

| NUMBER | DEPTH | W | W _L | W _P | CLASSIFICATION |
|--------|--------------|---|----------------|----------------|----------------|
| SB-2 | 1-2.5 BOTTOM | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

TESTING SERVICE CORPORATION
457 EAST GUNDERSEN DRIVE
CAROL STREAM, ILLINOIS 60188
L - 25,441

[illegible]

GRAIN SIZE ANALYSIS



| UNIFIED | GRAVEL | SAND | | SILT OR CLAY | |
|---------|--------|--------|------|--------------|------|
| A ASHO | GRAVEL | COARSE | FINE | SILT | CLAY |

[illegible]

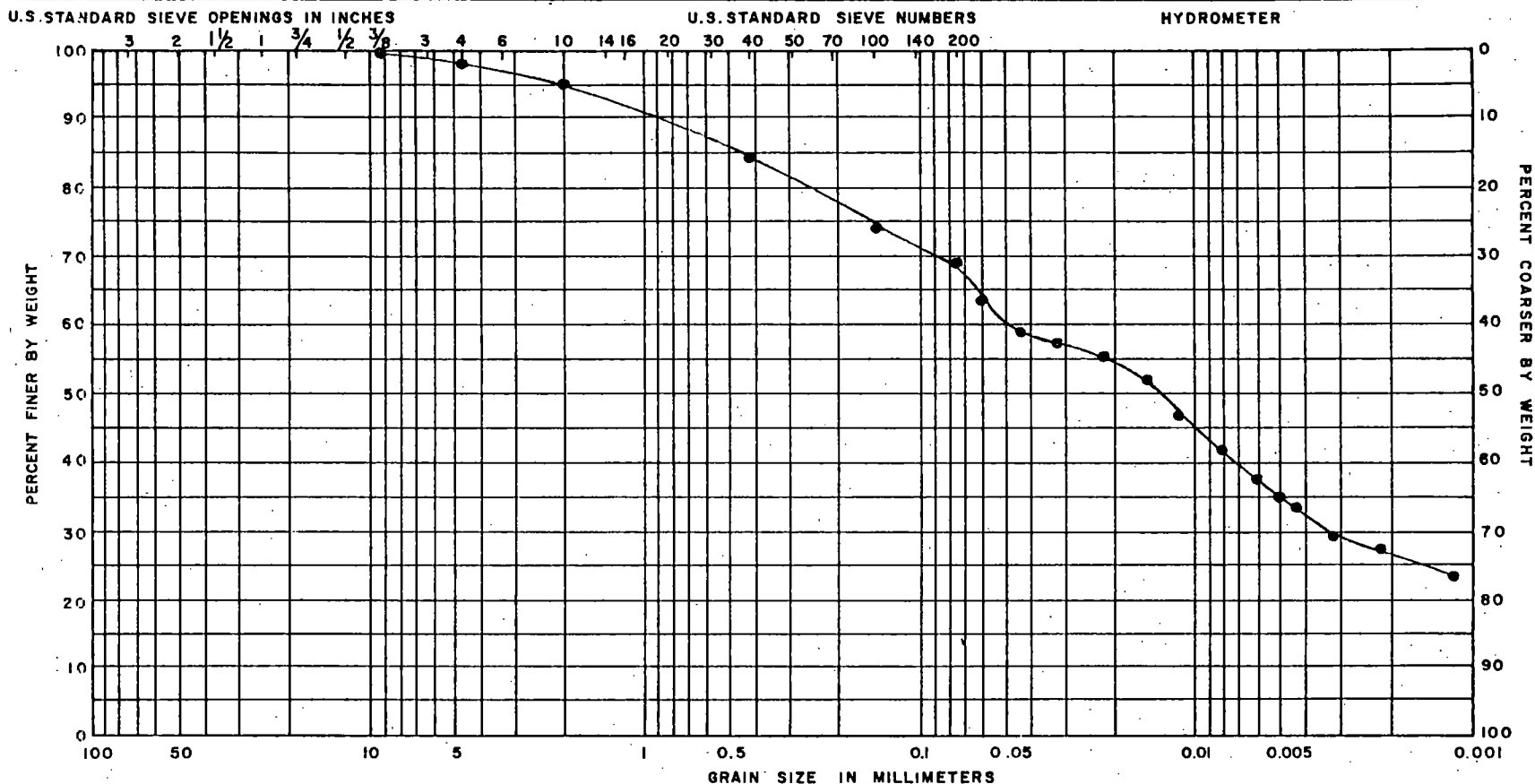
TESTING SERVICE CORPORATION
457 EAST GUNDERSEN DRIVE
CAROL STREAM, ILLINOIS 60188
L - 25,441

25441

8-4

8 1/2 - 10'

GRAIN SIZE ANALYSIS



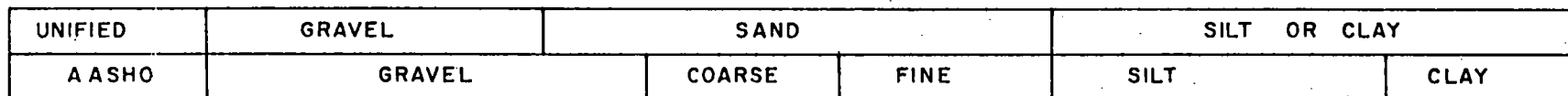
| | | | | | | |
|---------|--------|--|--------|------|--------------|------|
| UNIFIED | GRAVEL | | SAND | | SILT OR CLAY | |
| A ASHO | GRAVEL | | COARSE | FINE | SILT | CLAY |

| NUMBER | DEPTH | W | W _L | W _P | CLASSIFICATION |
|--------|--------|------|----------------|----------------|----------------|
| SB-4 | | | | | |
| ST-4 | 8.5-10 | 17.6 | 4.2 | 19 | CL |
| | | | | | |
| | | | | | |
| | | | | | |

TESTING SERVICE CORPORATION
 457 EAST GUNDERSEN DRIVE
 CAROL STREAM, ILLINOIS 60188

L - 25,441

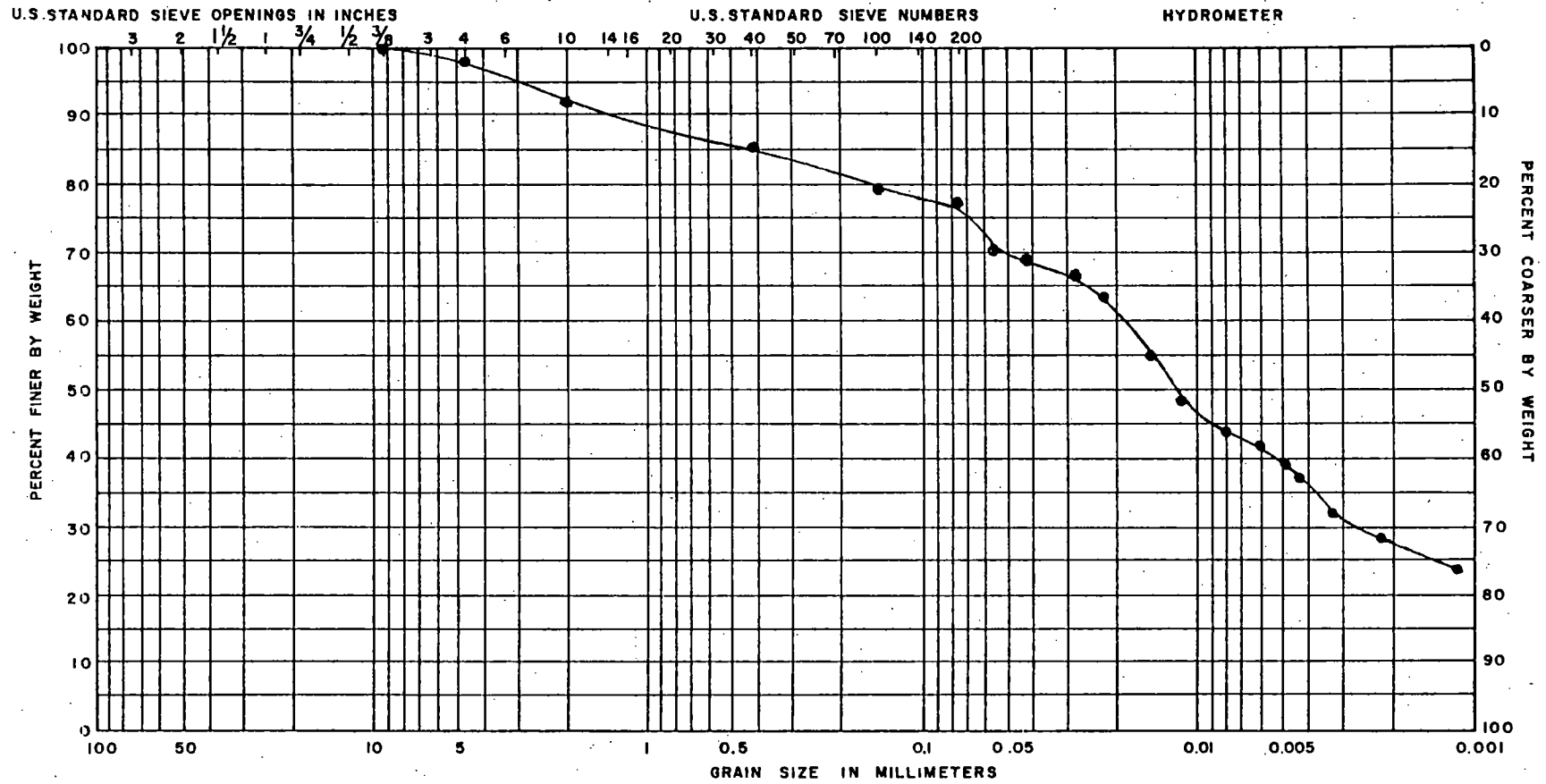
GRAIN SIZE ANALYSIS



TESTING SERVICE CORPORATION
457 EAST GUNDERSEN DRIVE
CAROL STREAM, ILLINOIS 60188
L - 25,441

25 11
GW-4
S-11

GRAIN SIZE ANALYSIS



| UNIFIED | GRAVEL | | SAND | | SILT OR CLAY | |
|---------|--------|--|--------|------|--------------|------|
| AASHO | GRAVEL | | COARSE | FINE | SILT | CLAY |

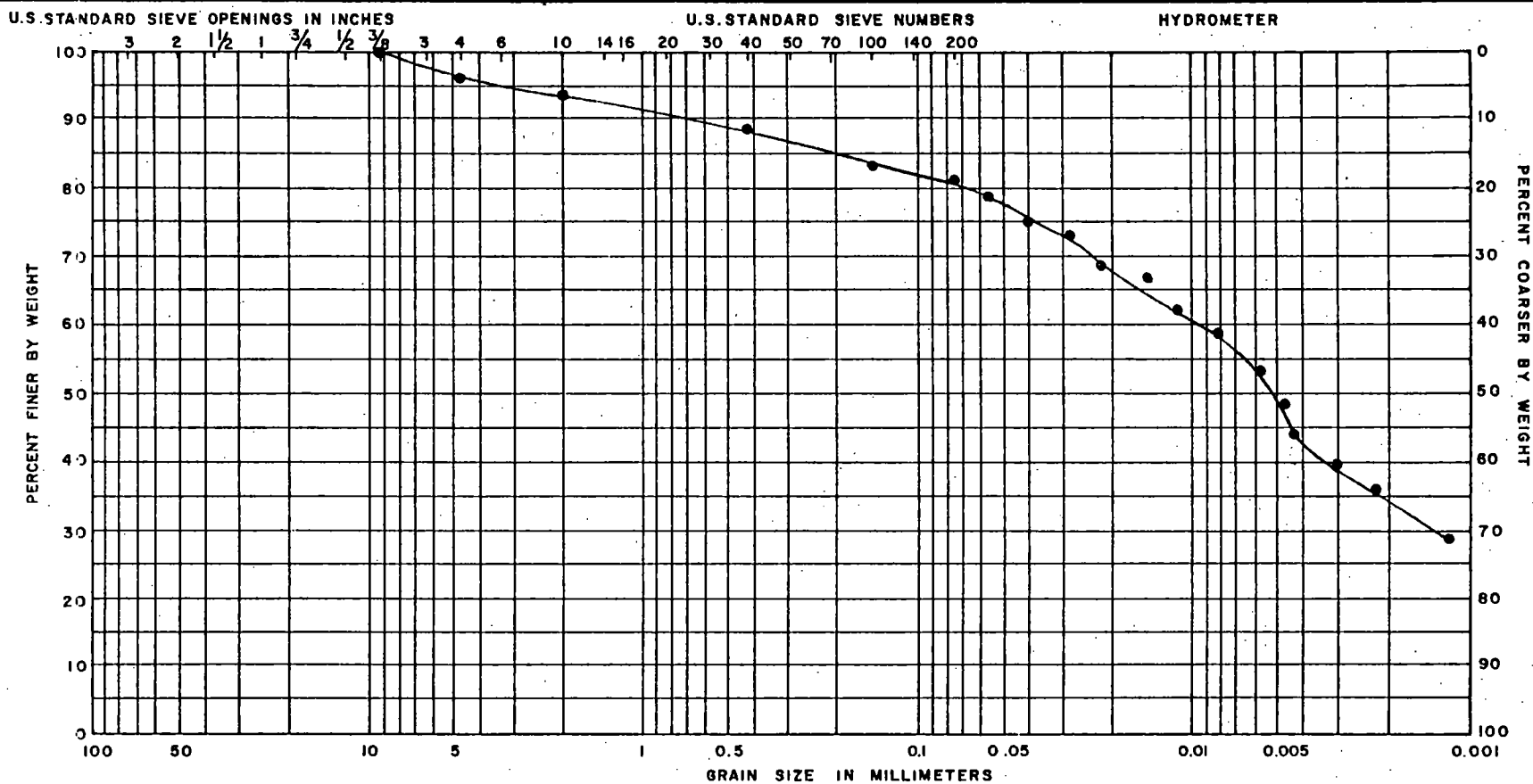
| NUMBER | DEPTH | W | W _L | W _P | CLASSIFICATION |
|--------|-------|------|----------------|----------------|----------------|
| GW-4 | | | | | |
| S-11 | 20-22 | 15.2 | 28 | 14 | CL |
| | | | | | |
| | | | | | |
| | | | | | |

TESTING SERVICE CORPORATION
 457 EAST GUNDERSEN DRIVE
 CAROL STREAM, ILLINOIS 60188
 L - 25,441

25441

S-7
S-23

GRAIN SIZE ANALYSIS



| UNIFIED | GRAVEL | SAND | | SILT OR CLAY | |
|---------|--------|--------|------|--------------|------|
| A ASHQ | GRAVEL | COARSE | FINE | SILT | CLAY |

| NUMBER | DEPTH | W | W _L | W _P | CLASSIFICATION |
|--------|-------|------|----------------|----------------|----------------|
| GW-7 | | | | | |
| S-23 | 44-46 | 17.5 | | | |
| | | | | | |
| | | | | | |
| | | | | | |

TESTING SERVICE CORPORATION
 457 EAST GUNDERSEN DRIVE
 CAROL STREAM, ILLINOIS 60188
 L - 25,441

Appendix C

Laboratory Groundwater Analysis Reports

☐ 2621 Ridgepoint
Austin TX 78754
512-928-8905

☐ 850 West Bartlett Rd.
Bartlett IL 60103
312-289-3100

☐ 222 South Morgan
Chicago IL 60607
312-666-4469

☐ 3548 35th St.
Rockford IL 61109
815-874-2171

CHAIN OF CUSTODY RECORD

| Client ARLINGTON HEIGHTS LANDFILL | | | | Project 2090 B | | | |
|--|-------------------|------|-------|-----------------------|---|----------------|----------------------|
| Sampler(s) | | | | | | | |
| Number | Sampling Location | Date | Time | Composite | | No. of Bottles | Remarks |
| | | | | Grab | | | |
| 2090GW-1 | ARLINGTON HEIGHTS | 5-12 | 2:15 | X | 2 | | pH |
| 2090GW-2 | ARLINGTON HEIGHTS | " | 4:40 | X | 2 | | CONDUCTIVITY |
| 2090GW-3 | ARLINGTON HEIGHTS | " | 12:10 | X | 2 | | Ca |
| 2090GW-4 | ARLINGTON HEIGHTS | " | 3:20 | X | 2 | | Mg |
| 2090GW-5 | ARLINGTON HEIGHTS | " | 1:00 | X | 2 | | Na |
| 2090GW-6 | ARLINGTON HEIGHTS | " | 11:30 | X | 2 | | K |
| 2090GW-7 | ARLINGTON HEIGHTS | " | 10:00 | X | 2 | | Sulfate |
| 2090GW-8 | ARLINGTON HEIGHTS | " | 4:00 | X | 2 | | Cl |
| 2090SW-1 | ARLINGTON HEIGHTS | " | 2:20 | X | 2 | | ALKALINITY AS |
| | | | | | | | BICARBONATE |
| | | | | | | | ONE BOTTLE FROM EACH |
| | | | | | | | BORING - CAR. FILTER |
| | | | | | | | |
| | | | | | | | |
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| | | | |
|------------------------------|-------------------------|---------|------|
| Relinquished By | Received By | Date | Time |
| JOHN PYRICH | | | |
| HARZA ENVIRONMENTAL SERVICES | | | |
| 150 S. WACKER DR. | | | |
| CHICAGO IL 60606 | | | |
| Shipping Notes | Received For Aqualab By | | |
| | Patti Plagge | 5/13/88 | 1345 |

☐ 2621 Ridgpoint
Austin TX 78754
512-928-8905

☐ 850 West Bartlett Rd.
Bartlett IL 60103
312-289-3100

☐ 222 South Morgan
Chicago IL 60607
312-666-4469

☐ 3548 35th St.
Rockford IL 61109
815-874-2171

CHAIN OF CUSTODY RECORD

| Client ARLINGTON HEIGHTS LANDFILL | | | | | Project 2090 B | | |
|--|-------------------|------|-------|-----------|-----------------------|----------------|---|
| Sampler(s) | | | | | | | |
| Number | Sampling Location | Date | Time | Composite | | No. of Bottles | Remarks |
| | | | | Grab | | | |
| 2090BW-1 | ARLINGTON HEIGHTS | 5-12 | 2:18 | X | | 2 | |
| 2090BW-2 | " | " | 4:40 | X | | 2 | ONE BOTTLE FROM |
| 2090BW-3 | " | " | 12:10 | X | | 2 | EACH WELL |
| 2090BW-4 | " | " | 3:20 | X | | 2 | (250 cc PLASTIC |
| 2090BW-5 | " | " | 1:00 | X | | 2 | LABELLED H ₂ SO ₄) - |
| 2090BW-6 | " | " | 11:30 | X | | 2 | - FOR TOC |
| 2090BW-7 | " | " | 10:00 | X | | 2 | ONE BOTTLE FROM |
| 2090BW-8 | " | " | 4:00 | X | | 2 | EACH WELL |
| 2090BW-1 | " | " | 2:20 | X | | 2 | (8 oz. GLASS) - |
| | | | | | | | - FOR TOX |
| | | | | | | | |
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| | | | |
|------------------------------|-------------------------|---------|------|
| Relinquished By | Received By | Date | Time |
| JOHN PYRICH | | | |
| HARZA ENVIRONMENTAL SERVICES | | | |
| 150 S. WACKER DR | | | |
| CHICAGO IL 60606 | | | |
| Shipping Notes | Received For Aqualab By | | |
| | Peter Plagg | 5/13/88 | 1315 |



NATIONAL
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NET Midwest, Inc.
Bartlett Division
850 West Bartlett Road
Bartlett, IL 60103
Tel: (312) 289-3100
Fax: 312-289-4180

Formerly: Aqualab, Inc.

ANALYTICAL REPORT

Mr. Bob Kewer
HARZA ENGINEERING CO.
150 So. Wacker Drive
Chicago IL 60606

06-21-88

Sample No.: 63098

Sample Description: 2090GW-2
2090 B

Date Taken: 05-12-88 1640

Date Received: 05-13-88 1345

| | | |
|--|-------|----------|
| Alkalinity, Bicarb. (CaCO ₃) | 476. | mg/L |
| Chloride | 140. | mg/L |
| Conductivity | 1770. | umhos/cm |
| pH | 7.43 | units |
| Sulfate | 205. | mg/L |
| Total Organic Carbon (TOC) | 4.4 | mg/L |
| Total Organic Halogens | 0.013 | mg/L |
| Calcium | 118. | mg/L |
| Magnesium | 85.0 | mg/L |
| Potassium | 26.2 | mg/L |
| Sodium | 83.0 | mg/L |

William H. Mottashed, Manager
Bartlett Division



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Formerly: Aqualab, Inc.

ANALYTICAL REPORT

Mr. Bob Kewer
HARZA ENGINEERING CO.
150 So. Wacker Drive
Chicago IL 60606

06-21-88

Sample No.: 63099

Sample Description: 2090GW-3
2090 B

Date Taken: 05-12-88 1210

Date Received: 05-13-88 1345

| | | |
|--|-------|----------|
| Alkalinity, Bicarb. (CaCO ₃) | 478. | mg/L |
| Chloride | 254. | mg/L |
| Conductivity | 2530. | umhos/cm |
| pH | 6.93 | units |
| Sulfate | 369. | mg/L |
| Total Organic Carbon (TOC) | 12.2 | mg/L |
| Total Organic Halogens | 0.093 | mg/L Cl- |
| Calcium | 238. | mg/L |
| Magnesium | 90.0 | mg/L |
| Potassium | 5.33 | mg/L |
| Sodium | 161. | mg/L |

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ANALYTICAL REPORT

Mr. Bob Kewer
HARZA ENGINEERING CO.
150 So. Wacker Drive
Chicago IL 60606

06-21-88

Sample No.: 63100

Sample Description: 2090GW-4
2090 B

Date Taken: 05-12-88 1520

Date Received: 05-13-88 1345

| | | |
|--|--------|----------|
| Alkalinity, Bicarb. (CaCO ₃) | 294. | mg/L |
| Chloride | 82. | mg/L |
| Conductivity | 1100. | umhos/cm |
| pH | 7.42 | units |
| Sulfate | 131. | mg/L |
| Total Organic Carbon (TOC) | 2.0 | mg/L |
| Total Organic Halogens | <0.005 | mg/L |
| Calcium | 89.3 | mg/L |
| Magnesium | 47.0 | mg/L |
| Potassium | 3.95 | mg/L |
| Sodium | 27.6 | mg/L |

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ANALYTICAL REPORT

Mr. Bob Kewer
HARZA ENGINEERING CO.
150 So. Wacker Drive
Chicago IL 60606

06-21-88

Sample No.: 63101

Sample Description: 2090GW-5
2090 B

Date Taken: 05-12-88 1300

Date Received: 05-13-88 1345

| | | |
|--|--------|----------|
| Alkalinity, Bicarb. (CaCO ₃) | 138. | mg/L |
| Chloride | 24. | mg/L |
| Conductivity | 934. | umhos/cm |
| pH | 7.90 | units |
| Sulfate | 239. | mg/L |
| Total Organic Carbon (TOC) | 2.4 | mg/L |
| Total Organic Halogens | <0.005 | mg/L |
| Calcium | 81.6 | mg/L |
| Magnesium | 26.7 | mg/L |
| Potassium | 3.25 | mg/L |
| Sodium | 62.0 | mg/L |


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ANALYTICAL REPORT

Mr. Bob Kewer
HARZA ENGINEERING CO.
150 So. Wacker Drive
Chicago IL 60606

06-21-88

Sample No.: 63102

Sample Description: 2090GW-6
2090 B

Date Taken: 05-12-88 1130

Date Received: 05-13-88 1345

| | | |
|--|-------|----------|
| Alkalinity, Bicarb. (CaCO ₃) | 388. | mg/L |
| Chloride | 182. | mg/L |
| Conductivity | 1430. | umhos/cm |
| pH | 7.16 | units |
| Sulfate | 84. | mg/L |
| Total Organic Carbon (TOC) | 2.1 | mg/L |
| Total Organic Halogens | 0.009 | mg/L |
| Calcium | 137. | mg/L |
| Magnesium | 48.0 | mg/L |
| Potassium | 5.35 | mg/L |
| Sodium | 61.0 | mg/L |

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ANALYTICAL REPORT

Mr. Bob Kewer
HARZA ENGINEERING CO.
150 So. Wacker Drive
Chicago IL 60606

06-21-88

Sample No.: 63103

Sample Description: 2090GW-7
2090 B

Date Taken: 05-12-88

Date Received: 05-13-88 1345

| | | |
|--|-------|----------|
| Alkalinity, Bicarb. (CaCO ₃) | 230. | mg/L |
| Chloride | 128. | mg/L |
| Conductivity | 1040. | umhos/cm |
| pH | 7.43 | units |
| Sulfate | 75. | mg/L |
| Total Organic Carbon (TOC) | 1.8 | mg/L |
| Total Organic Halogens | 0.018 | mg/L |
| Calcium | 93.8 | mg/L |
| Magnesium | 48.3 | mg/L |
| Potassium | 4.79 | mg/L |
| Sodium | 46.3 | mg/L |

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ANALYTICAL REPORT

Mr. Bob Kewer
HARZA ENGINEERING CO.
150 So. Wacker Drive
Chicago IL 60606

06-21-88

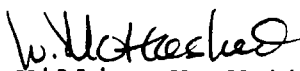
Sample No.: 63104

Sample Description: 2090GW-8
2090 B

Date Taken: 05-12-88 1600

Date Received: 05-13-88 1345

| | | |
|--|-------|----------|
| Alkalinity, Bicarb. (CaCO ₃) | 680. | mg/L |
| Chloride | 210. | mg/L |
| Conductivity | 2200. | umhos/cm |
| pH | 6.85 | units |
| Sulfate | 59. | mg/L |
| Total Organic Carbon (TOC) | 20.6 | mg/L |
| Total Organic Halogens | 0.056 | mg/L |
| Calcium | 157. | mg/L |
| Magnesium | 66.0 | mg/L |
| Potassium | 37.2 | mg/L |
| Sodium | 163. | mg/L |


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ANALYTICAL REPORT

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Chicago IL 60606

06-21-88

Sample No.: 63105

Sample Description: 2090SW-1
2090 B

Date Taken: 05-12-88 1420

Date Received: 05-13-88 1345

| | | |
|--|-------|----------|
| Alkalinity, Bicarb. (CaCO ₃) | 138. | mg/L |
| Chloride | 72. | mg/L |
| Conductivity | 659. | umhos/cm |
| pH | 8.15 | units |
| Sulfate | 62. | mg/L |
| Total Organic Carbon (TOC) | 5.1 | mg/L |
| Total Organic Halogens | 0.006 | mg/L |
| Calcium | 59.7 | mg/L |
| Magnesium | 21.4 | mg/L |
| Potassium | 3.90 | mg/L |
| Sodium | 39.3 | mg/L |

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ANALYTICAL REPORT

Mr. Bob Kewer
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150 So. Wacker Drive
Chicago IL 60606

06-21-88

Sample No.: 63097

Sample Description: 2090GW-1
2090 B

Date Taken: 05-12-88 1415

Date Received: 05-13-88 1345

| | | |
|--|-------|----------|
| Alkalinity, Bicarb. (CaCO ₃) | 412. | mg/L |
| Chloride | 112. | mg/L |
| Conductivity | 1540. | umhos/cm |
| pH | 7.42 | units |
| Sulfate | 219. | mg/L |
| Total Organic Carbon (TOC) | 4.7 | mg/L |
| Total Organic Halogens | 0.080 | mg/L |
| Calcium | 159. | mg/L |
| Magnesium | 68.0 | mg/L |
| Potassium | 7.58 | mg/L |
| Sodium | 52.5 | mg/L |

William H. Mottashed, Manager
Bartlett Division